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The Neuropsychosocial Preparation Theory

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Brain, School, and Society

The Neuropsychosocial Preparation Theory

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To
*the memory of Cyrus the Great (600 or
576–530 BC) and A. Ferdowsi (940–1020
BC): the first, a righteous king, created and
implemented the first document of human
rights, and the second, a determined poet,
who after 30 years of hard work created
"Shah-nameh," the masterpiece of ancient
Persian history that uplifted the over
3000-year-old Persian concept of "kherad,"
meaning wisdom under ethic.*

To
*UNICEF, the powerful child-focused
authority that struggles to actualize the
United Nations Child Convention throughout
the world.*

Science gives one a structured opportunity to
try out ideas—and, if one is not afraid of
falling on one's face, to try out ideas that are
raw, important, and bold.

(Kandel 2006, p. 115)

Contents

Think! Before It Is Too Late (De Bono 2009)

At present, the work of teaching must not only transform natural tendencies into trained habits of thought, but must also fortify the mind against irrational tendencies current in the social environment, and help displace erroneous habits already produced (Dewey 2010, p. 26).

I learned how (1) to find out what the problem is, (2) to think about the desirable situation, (3) to think about possible options, and (4) to choose one option and plan for its realization (A 13-year-old pupil, this book).

Prologue

From ancient philosophers of East and West such as Zarathustra (1767–1690 BC) and Aristotle (384–322 BC) to more recent theoreticians from North America and the Soviet Union (now Russia) such as John Dewey (1859–1952) and Lev Vygotsky (1896–1934), from guidelines of the United Nations Child Convention (1989) to discoveries of neuroscience, they all have contributed valuable ideas on how, through education, we can ameliorate our societies. Nearly 4000 years ago, Zarathustra (2007, p. 64), the secular Iranian social thinker, often referred to as the world's first influential philosopher, formed one of the first educational groups named "the assembly of magi" and hoped to be "among those who make this world new and fresh!" Aristotle emphasized that children should learn excellent reasoning, childhood should be devoted to the acquisition of certain habits of cognitive power, and this time of our lives should be partly devoted to preparation for adult life (Kraut 2002, pp. 50–97).

However, it was during the last 100 years that some scholars such as Dewey and Vygotsky presented detailed programs on how to educate children and youths with emphasis on their cognitive capacities. What these two scholars have left for us is amazingly acknowledged by the recent discoveries of neuroscience, a science that became a university discipline after the death of these two influential social thinkers. And it was only in 1989 that the United Nations Child Convention demanded that schools throughout the world must create proper spaces so that pupils can develop their cognitive capacity and become prepared for a responsible and meaningful adult life.

It is reasonable to conclude that we already have sufficient scientific, philosophical, and internationally recognized conventional bases to educate and prepare pupils for responsible adult life. Svensson (2016), through her doctoral thesis, raises an important question "Do you dare to think outside of the box?" Christakos (2011, p. xiii) emphasized that thinking outside the box is the key to understanding the fact that many of "today's real-world problems cannot be solved within the boundaries of a single scientific discipline." Therefore, this book can be understood as a twofold contribution that: (a) negates a narrow single disciplinary focus and creatively integrates knowledge from different disciplines and (b) encourages

patient and continuous testing and refining of the results of this multidisciplinary construct in constant intervention research.

This is the first of a series of books about the brain, school, and society. Theses volumes are based on a chain of intervention research started in 2009 and are ongoing.

The main aim of this first volume is to present a neuropsychosocial theory based on intervention research in schools in Sweden. This theory has seven building blocks. The first is the United Nations Child Convention, particularly Article 29, which demands that schools throughout the world create contexts so that pupils learn not only literacy and numeracy but also basic skills to make well-balanced decisions, to develop social relationships and become prepared to accept social responsibility.

The second building block is to learn from the discoveries of neuroscience, particularly the executive functions of the prefrontal cortex in human beings. These functions are crucial for systematic thinking, successful decision making, and problem solving in complicated modern societies.

The third building block of this theory is about creating the proper context in the classroom. This context involves a three-moment pedagogy: an individual moment when every pupil gets the chance to train her or his patience and think creatively; a group moment when pupils in small groups train themselves to listen to each other and cooperate to reach agreement about solving a problem; and a third moment when groups present their discussions.

The fourth building block of this new theory is about learning. This volume presents a learning that is called interactionist-developmentalist learning and gets inspiration from both Dewey and Vygotsky who saw development as the result of learning. This learning is also much about the result of interaction with others—pupils as well as teachers.

The fifth building block refers to social problem solving, which aims to lift up the idea that in schools, pupils learn to solve subject-based problems but not problems of daily life or social problems. Schools must respect the Child Convention, but unfortunately they neglect Article 29, which, as mentioned earlier, focuses on education content.

The sixth building block refers to the concept of preparation, which has played a crucial role in the construction of this theory. I explain how an ordinary term can be developed into a kind of umbrella concept, integrating several other important concepts of this intervention-based research.

The seventh building block refers to the concept of ameliorative preadaptation to the world. This term is a combination of the concept of amelioration, which was one of the pragmatists' important concepts, and the neuroscientific concept of preadaptation to the world, which is an important function of the prefrontal cortex of the human brain (see Fuster 2013a, b).

These seven building blocks cover a range of topics from the brain to the school and from these, to society. Although this evolving theory is constructed on the basis of school interventions in Sweden, it can be implemented in other countries. In other words, this circle of theory-intervention-theory is not local, that is, not based

on Swedish conditions. All the building blocks mentioned above are very general and suitable for use anywhere in the world, for example, the guidelines, or what should be done, come from the Child Convention, which is an international document for all societies in the world. And, the theoretical framework used here—mainly based on Dewey's educational philosophy and neuroscience—is very general and can be implemented and refined further in any society. "*Theories thus become instruments, not answers to enigmas, in which we can rest.* We don't lie back upon them, we move forward, and, on occasion, make nature over again by their aid. Pragmatism unstiffens all our theories, limbers them up and sets each one at work" (James 1907/1995, p. 21, emphasis in original).

References

Zarathustra. (2007). *The Gathas: The sublime book of Zarathustra* (K. Khazai, Introduction, Trans.). Brussels: European Centre for Zoroastrian Studies.

Kraut, R. (2002). *Aristotle: Political philosophy*. Oxford: Oxford University Press.

Svensson, N. (2016). *Do you dare to think outside the box?* Ph.D. thesis no. 16, Karlstad University, Sweden.

Christakos, G. (2011). *Integrative problem-solving in a time of decadence*. Dordrecht: Springer.

Fuster, J. (2013a) Cognitive functions of the prefrontal cortex. In D. Stuss & R. Knight (Eds.), *Principles of frontal lobes functions* (2nd ed., pp. 11–22). New York: Oxford University Press.

Fuster, J. (2013b). *The neuroscience of freedom and creativity: Our predictive brain.* Cambridge: Cambridge University Press.

James, W. (1907). *Pragmatism*. New York: Dover Publications.

Chapter 1
Introduction

Abstract This chapter is mainly devoted to clarifying for the reader what this book is about with a statement of the problem and the aims. *Statement of the problem*: Despite the willingness of youth to be part of the solution for social problems, there is no purposeful and systematic school program to encourage and develop this precious quality in youth. *General aim*: Through a series of design experiments (intervention research subprojects in schools), to develop a program for social problem-solving literacy. This new literacy has the potential to prepare pupils for ameliorative preadaptation to the world and includes

- Learning that one should not rush to choose the first option that comes to mind for the solution of a problem; but to stop and think to find the best available option.
- Learning/training to solve social problems by mastering the use of a model.
- Learning to think reflectively and with social responsibility about self and amelioration of the world.

 Specific aim of the first subproject: To build a theory for further testing in other subprojects.

Keywords Child Convention · Social and emotional education · Social responsibility · A new literacy

According to income-based measures of poverty, 1.2 billion people live on US$1.25 or less a day. However, according to the UNDP Multidimensional Poverty Index, almost 1.5 billion people in 91 developing countries are living in poverty with overlapping deprivation in health, education, and living standards. And although poverty is declining overall, almost 800 million people are at risk of falling back into poverty if setbacks occur. Many people face either structural or life-cycle vulnerabilities (UNICEF 2014). About 17,000 children die every day, mostly from preventable or treatable causes. The births of nearly 230 million children under 5 years of age worldwide (about one in three) have never been officially recorded, depriving them of their right to a name and nationality. Some 2.5 billion people lack access to improved sanitation, including 1 billion who are forced to resort to open

defecation for lack of other options. Of an estimated 35 million people living with HIV, over 2 million are 10–19 years old, and 56% of them are girls. Globally, about one third of women aged 20–24 years were child brides. Every 10 min, somewhere in the world, an adolescent girl dies as a result of violence. Nearly half of all deaths in children under 5 years of age are attributable to undernutrition. This translates into the unnecessary loss of about 3 million young lives a year (UNICEF 2014). It is possible, indeed, to devote many more lines and paragraphs to present factual statistics about the problems existing in the world. It is not controversial to state that our world is full of problems; what is indeed controversial are suggestions about how to meet these problems.

> On the 25th anniversary of the Child Convention, UNICEF observed that "*The State of the World's Children* calls for brave and fresh thinking to address age-old problems that still affect the most disadvantaged children. In particular, there is a need for innovation—and for the best and brightest solutions to benefit every child" (UNICEF Report, November 2014, emphasis in original).

What could be the "brave and fresh thinking" in meeting "age-old problems"? Some scholars believe that "the most promising ideas for new research projects often come, not from reading the literature, but from observation" (Shoemaker et al. 2004, p. 170). In line with this suggestion, I refer to some of my observations to find a "brave and fresh" idea.

1.1 Some Observations

A 9-year-old Swedish girl, Milla Martin, was watching TV with her mother when she saw a film about starving African children. She became sad and irritated and asked: "Why don't we do something to help these children?" Together with some other children, they decided to bake cakes and sell them in order to collect money to support them. Their responsible social action inspired other children and youth in Sweden who did the same thing. They succeeded in collecting hundreds of thousands of Swedish krona for this human cause. As a result, Milla Martin was one of the few persons nominated as "Swedish heroes of the year." Consequently, in 2011, on a popular nation-wide TV program involving the Swedish Prime Minister, she received her prize: travelling with her family to Tanzania in a "study-travel" to find out how her "cake-baking movement" could help these less fortunate children (Aftonbladet, December 17, 2011).

Amira Willighagen, an 8-year-old girl with an amazing talent for operatic singing, won Holland's Got Talent in 2013. Immediately after becoming famous, she participated in a ceremony to collect money for charity. Later she travelled to

South Africa to realize a dream of Nelson Mandela to build a playground for African children (http://amira-online.com/). Angelina Jordan, a 7-year-old girl who won Norway's Got Talent program, has appeared barefoot on many programs to show sympathy for needy children who walk on the streets without shoes (https://en.wikipedia.org/wiki/Angelina_Jordan).

These inspiring stories are not limited to children from Europe. For example, Iqbal Masih, who was born in 1983 in Pakistan, was sold into bondage by his family at 4 years of age. Iqbal's family borrowed 600 rupees (US$12) from a local employer who owned a carpet-weaving business, and in return, Iqbal was required to work as a carpet weaver until the debt was paid off. Every day, he would rise before dawn and make his way along dark country roads to the factory, where he and most of the other children were tightly bound with chains to prevent escape. He worked 14 h a day, 7 days a week, with only a 30-min break. At the age of 10 years, Iqbal escaped his slavery, after learning that bonded labor was declared illegal by the Supreme Court of Pakistan. But he was caught by police and brought back. Soon after, the police were bribed and Iqbal was tied upside down. Iqbal escaped a second time and later joined the Bonded Labour Liberation Front of Pakistan to help stop child labor around the world. Iqbal helped over 3000 Pakistani children who were in bonded labor to escape to freedom, and he made speeches about child labor throughout the world. Iqbal was fatally shot in Muridke on April 16, 1995, shortly after returning from a trip to America. He was 12 years old at the time. Some say that he was shot by a farmer, and some say that he was murdered because of his influence over bonded labor. His funeral was attended by many mourners. There is a book called Iqbal that shares the story of his legacy (Wikipedia).

Iqbal's cause inspired the creation of organizations such as Free the Children, a Canada-based charity and youth movement, and the Iqbal Masih Shaheed Children Foundation, which has set up over 20 schools in Pakistan. In January 2009, the United States Congress established the annual Iqbal Masih Award for the Elimination of Child Labor. In 1994, Iqbal visited Broad Meadows Middle School in Quincy, Massachusetts, and spoke to 7th graders about his life. When the students learned of his death, they decided to raise money and build a school in his honor in Pakistan (Wikipedia).

The most outstanding example is Malalah Yousefzai (1997–), a Pakistani activist known for her struggle for girls' right to education. Yousafzai's advocacy has grown into an international movement. In early 2009, when she was 11–12 years old, Yousafzai wrote a blog under a fictitious name for the BBC detailing her life under Taliban occupation and her views on promoting education for girls in the Swat Valley. Yousafzai rose in prominence, giving interviews on television, and she was nominated for the International Children's Peace Prize by South African activist Desmond Tutu. On the afternoon of 9 October 2012, Yousafzai boarded her school bus in the northwest Pakistani district of Swat. A gunman pointed a pistol at her and fired three shots. In the days immediately after the attack, she remained unconscious and in critical condition, but later her condition improved enough for

her to be sent to England for intensive rehabilitation. The assassination attempt led to national and international support for Yousafzai.

On 10 October 2014, Yousafzai was announced as the co-recipient of the 2014 Nobel Peace Prize for her struggle against the suppression of children and young people and for the right of all children to education. At 17 years of age, Yousafzai is the youngest ever Nobel Prize Laureate (Wikipedia; Yousafzai 2015).

The most powerful and impressive organization to come from these inspiring cases is Free the Children, "an international charity and educational partner, working both domestically and internationally to empower and enable youth to be agents of change" (http://www.freethechildren.com/). What makes this organization interesting is not its charity activities but the fact that it is "an organization that holds at the core of its mission a mandate to empower youth to reach their fullest potential" (founder of Free the Children, Craig Klienburger, 2014, in an announcement about Malalah winning the Nobel Prize). Free the Children works to empower youth to remove the barriers that prevent them from being active local and global citizens. Their domestic and international programs work together to achieve the following goals:

- In Canada, the United States, and the United Kingdom, the organization provides comprehensive programs for service learning and active citizenship.
- The organization educates, engages, and empowers youth in North America, the United Kingdom, and around the world with the tools, knowledge, confidence, and support network to be ambassadors for change and lead meaningful action.
- The organization works together with communities in Africa, Asia, and Latin America to establish a comprehensive, child-focused development approach that gives all community members the education, skills, and opportunity to lift themselves out of poverty forever.
- The organization has a rights-based approach that ensures that they are not only helping communities realize their rights (such as a primary education) but building awareness of basic human rights throughout the process, thereby ensuring a long-term impact. This approach addresses inequity based on gender, ethnicity, and socio-economic status (particularly relevant in India where the lingering impact of the caste system still denies so many people access to basic human rights).
- Free the Children reports impressive success with their activities: "Adopt a Village": 650+ schools and school rooms have been built, facilitating the education of 55,000 children every day; medical supplies worth US$16,000,000 have been shipped around the world; 30,000 women have become economically self-sufficient; 1,000,000 people have been provided with clean water, health care, and sanitation.

However, what makes Free the Children different from many other child/youth organizations—and is very important for these research subprojects—is the point that:

> "Most charities focus on children and young people as the recipients of aid, as problems to be solved. At Free the Children, we proudly believe that youth can be the greatest problem solvers. Instead of making the world a better place *for* our children, we know we can make the world a better place *with* our children" (Double emphasis in original) (http://www.freethechildren.com/).

These cases presented here show that some children and youths, as individuals and in groups, have the capacity for heroic social responsibility.

1.2   Social Responsibility and Youth

Although young heroes remain a powerful inspiration and leaders for other children and youth, we need to "normalize heroism," that is, develop it further from just a few to many more cases. The Cake-Help Movement in Sweden and Free the Children, now an international movement, show how individual heroism can develop into collective heroism of an army of children and youth. But because of the enormity of the world's problems we cannot put all our hopes in these individual and collective heroes; measures must be taken to engage many more youth. *Through education for social responsibility*, we can engage many more children/youth to develop their capacity for a sort of *collective heroism* for ameliorative actions. Social responsibility has emerged over the last decade as an expansion of the field of study previously labeled citizenship or civic education. The concept of social responsibility is broader in that it encompasses the developing adolescents' social skills while enabling them to be active and responsible members of their larger communities. Social responsibility is multidimensional in that being responsible goes beyond just being respectful of others; it means experiencing, as well as appreciating our interdependence and connectedness with others and our environment. The ability of adolescents to identify and define social responsibility is important in defining who they are, where they fit in the social world, and building confidence in their sense of agency (Berman 1997; Berman and LaFarge 1993). This is at the heart of the kind of education that John Dewey meant by emphasizing the simultaneous advancement of self and society (Dewey 1916).

Dewey (1922, pp. 9–10) indicated that "there are two schools of social reform." One asserts that "the only way to change institutions is for men to purify their hearts, and that when this has been accomplished, change of institutions will follow of itself." The other school of social reform denies the existence of such inner power and insists that "men are made what they are" by the forces of the environment. But Dewey suggested a third alternative between these two theories:

> We can recognize that all conduct is *interaction* between elements of human nature and the environment, natural and social. Then we shall see that progress proceeds in two ways, and that freedom is found in that kind of interaction which maintains an environment in which

human desire and choice count for something. There are in truth forces in man as well as without him. While they are infinitely frail in comparison with external forces, yet they may have the support of a foreseeing and contriving intelligence. When we look at the problem as one of an adjustment to be intelligently attained, the issue shifts from within personality to an engineering issue, the establishment of arts of education and social guidance. (Dewey 1922, p. 10, emphasis in original)

The United Nations Committee on the Rights of the Child is very critical about the fact that schools in the world do not seriously prepare children and youths to become responsible citizens. Article 29 focuses on the direction of education in schools:

(a) The development of the child's personality, talents, and mental and physical abilities to their fullest potential;
(b) The development of respect for human rights and fundamental freedoms, and for the principles enshrined in the Charter of the United Nations;
(c) The development of respect for the child's parents, his or her own cultural identity, language, and values, for the national values of the country in which the child is living, the country from which he or she may originate, and for civilizations different from his or her own;
(d) The preparation of the child for responsible life in a free society, in the spirit of understanding, peace, tolerance, equality of sexes, and friendship among all peoples, ethnic, national and religious groups, and persons of indigenous origin;
(e) The development of respect for the natural environment.

Article 29 of Child Convention is summarized for the purpose of this project as follows: schools everywhere in the world are obliged to create contexts in which every child can optimally develop her or his mental ability, and schools should prepare children to have social responsibility. This summary is in line with John Dewey's ideas that the young should remember that their great aim should be to uplift humanity. If education tends to improve the mind and lead the ones enjoying it to altruistic effort, then it will not be in vain (Stallman 2003).

1.3 PISA and Its Problem-Solving Test

The Program for International Student Assessment (PISA) provides tests in mathematics, natural sciences, reading abilities, and problem-solving capacity for 15-year-old pupils who belong to OECD countries. The problem-solving test is relevant to the current project. In 2012, PISA defined problem-solving capacity in these words:

[A]n individual's capacity to engage in cognitive processing to understand and resolve problem situations where a method of solution is not immediately obvious. It includes the willingness to engage with such situations in order to achieve one's potential as a constructive and reflective citizen.

PISA measures four problem-solving processes in its test: (1) understanding the problem through creating a mental picture of it; (2) describing the problematic situation orally, in writing, or through symbols; (3) constructing a plan including a goal and realizing it; (4) following the process and reflecting over the planned solution. The aim of the problem-solving test is to measure pupils' general capacity to solve the problems of daily life:

> The problem-solving assessment in PISA 2012 focuses on general cognitive processes involved in problem solving, rather than on the ability to solve problems in particular school subjects.

As we see, learning "general problem-solving" is recognized as an important issue, however, there is no particular subject devoted to this task. General problem solving means problems that are not directly connected to any specific subject, for example, problems in mathematics or physics. Another word can be "social problem solving." In line with Shier (2011, p. 365) I emphasize that the term social problem solving "highlights the social context of problem solving." The emphasis in this book is that schools do not devote enough time to create spaces so pupils' can develop their cognitive capacities for solving social problems.

1.4   The Movement for Social and Emotional Education

Within the last few decades, a movement that embraces many countries under the umbrella of "responsible education" has become increasingly active. This movement is carrying out a global initiative to gather resources and educational techniques with a view "to facilitating and encouraging emotional, cognitive and social development in children and young people—thus helping them to become self-motivating, competent, responsible and mutually supportive members of society" (Clouder 2008, p. 9). This movement suggests that "research indicates that SEE [Social and Emotional Education] has a positive effect on the well-rounded development of children and young people—and brings benefits in the area of emotional well-being, of academic achievement, and social relationships (Clouder 2008, p. 11). Rene Diekstra (in Clouder 2008, p. 257) suggests that

> Failure or refusal to adopt and appropriately support the implementation of SEL/SFL [Social and Emotional Learning/Skills for Life] programmes in primary and secondary education is equal to depriving children and youngsters of crucial and scientifically substantial opportunities for their personal, social and academic development. This would be a flagrant violation of the United Nations Convention of the Rights of the Child.

At this point, we can attempt to integrate the above sources into an argument for designing a new literacy.

1.5   An Argument for Designing a New Literacy

As the school schema from Sweden shows, pupils attend school for about 30 h a week. The situation is more or less the same in other countries and as the United Nations has witnessed, countries do not systematically follow Article 29. Although all subjects, in one way or another, can contribute to mental development, no specific subject is devoted to teaching social responsibility. No subject can match what many scholars called "Social and Emotional Education." No subject specifically focuses on strengthening social problem-solving capacity in youth according to the wishes of Free the Children.

Pupils do of course gain a lot from learning, for example, physics and chemistry. Subjects like these help them to develop their mental capacity. A few pupils, indeed very few, may in future become teachers in schools or universities. However, the great majority will not become directly engaged in using their knowledge from these subjects, but all pupils without exception, both as youth and as adults, will face social problems that have to be solved. I am not arguing that traditional subjects should be removed for the sake of the new ones, but a place must be found for this new literacy alongside literacy, numeracy, and other subjects.

1.6   Statement of the Problem, the Aims, and the Research Question

The problem, aims, and research question can now be formulated. The sources that were presented above and support this formulation are: (1) Child Convention, (2) PISA, (3) Dewey's educational philosophy, (4) movement for emotional and social education, (5) observations, (6) Swedish educational system, and (7) a strong argument.

1.6.1   Sources that Influenced the Formulation of the Problem, Aims, and Research Question

1. Child Convention: every youth has the right to optimal mental development and schools should prepare pupils for performance of social responsibility. However, according to the United Nations, there is no systematic program in schools that develops this capacity in pupils.
2. John Dewey's educational philosophy emphasizes that education should simultaneously develop self and society. Education should function as a vehicle for social amelioration.

3. Observation of youth's potentialities reveals that they are prepared to be part of the processes of social problem solving.
4. PISA investigation: pupils need to learn (general) problem solving.
5. Swedish educational system: there is no purposeful and systematic teaching of social problem solving.
6. Movement for social and emotional education: there is a need for "emotional and social education" in schools.
7. An important argument: there is no logic behind the dominant practice that pupils' need to learn traditional subjects, such as mathematics, physics, and chemistry, is more than their need to learn social problem solving.

1.6.2 Statement of the Problem

Despite the willingness of youth to be part of the solution for social problems, there is no purposeful and systematic school program to invest in and develop this precious quality in youth.

1.6.3 Aims

General aim: Through a series of design experiments (intervention research sub-projects in schools), develop a program for social problem-solving literacy. This new literacy has the potential to prepare pupils for ameliorative preadaptation to the world and includes

- Learning that one should not rush to choose the first option that comes to mind for the solution of a problem; but can stop and think to find the best available option.
- Learning/training to solve social problems by mastering the use of a model.
- Learning to think reflectively and with social responsibility about self and amelioration of the world.

Specific aim of the first subproject: To build a theory for further testing in other subprojects.

1.6.4 Research Question

What are the possibilities and challenges in realizing this subproject?

1.7   Outline of This Book

This chapter describes the seven sources that influenced the formulation of this subproject's statement of the problem, the aims, and research question. Chapter 2 prepares the reader to think about the close connection between philosophy (particularly pragmatism) and scientific research in this book. Chapter 3 is devoted to building a framework for sensitizing concepts. These are very basic concepts that can be developed in different subprojects. The methodological principles of this research subproject are presented in Chap. 4. This entire chapter is devoted to the methodology to emphasize its importance. Methodology is defined as the principles that underlie and guide the whole process of research. According to the suggestion from one of the peer reviewers, Chaps. 2–4 could be integrated and presented in a single chapter named methodology. Indeed these three chapters are very much interrelated and each in its own way contributes to the methodology of this intervention research. However, such an act would create a very long chapter that would be difficult to organize. Therefore, I have chosen to present them in three chapters. Chapter 5 describes the intervention in the classroom. Chapter 6 presents the results of the first subproject. I have tried to create a balance between presenting data in a long chapter (which may bore the readers) and a short chapter (which may not give the full picture of how this new theory is intervention based). Chapter 7 is an attempt to integrate the results and reflect on them. Chapter 8 is the author's attempt to build a new theory for social problem-solving literacy in schools. Chapter 9 is an interesting comparison between a woman in Iran and a pupil in Sweden. The first was a participant in an empowerment-oriented research project in Iran and the second was a participant in this subproject in Sweden. Hopefully, this comparison raises interesting questions important for further subprojects. Chapter 10 presents the discussion. I have introduced a system that includes three subsystems for hard thinking through which I present different issues in the discussion. My hope is that in future I can complete these three subsystems of hard thinking to the point that the system can be used by doctoral students and other researchers. Chapter 11 is devoted to what happened in the second subproject and gives the readers a picture of how the first subproject has continued. Such a picture is vital to understand and judge the seriousness of the first subproject.

The model that I had in mind for writing this book was a doctoral dissertation with a seminar and opponents (peer reviewers), and finally revision of the manuscript. A doctoral thesis is a kind of examination; one has to explicitly show what has been done and what the results are.

In line with the insights of the emerging field called "knowledge visualization" (Tegran and Keller 2005; Meyer 2008/2009; Lima 2014), the ideas in this book are presented with the help of many figures and tables. These figures and tables have helped me to practice hard thinking and organize my thoughts. I hope that they can help the readers to follow these ideas more easily. "Figures, tables and graphs are often used in scientific reports. They are valuable because they can be used to present complex results in a readable way, but it is important that they are used

carefully" (http://learninghub.une.edu.au/tlc/aso/aso-online/academic-writing/tables-figures.php).

This book also includes a style of marking some statements and propositions with numbers. This technique gave me the chance to purposefully interpret or reread these statements through the marked numbers. The use of these markers helped me in my hard thinking process, hopefully this will also contribute to the richness of this work.

This volume has been peer reviewed and modified twice; first within a seminar at my university, and then by the peer reviewers of Springer.

1.8 An Important Note

Throughout this book, I present a tripartite construct that includes (1) the individual pupil, (2) the context of the classroom, and (3) the world. These three are closely connected, however, a researcher cannot study all three in detail. So either a researcher chooses one level to go into in depth or finds a way to connect two or three of these levels. The first choice is the most dominant. Indeed, university systems are set up to study one domain; psychologists focus on individuals, social psychologists focus on studying groups and relationship/communication between individuals, and sociologists are interested in studying social institutions and society as a whole. In other words, it is more accepted to focus on one of the three levels. However, it is possible to have a research design that has its focus on one level but finds relevant connections to the other two levels. This demands a methodology that guides the whole process of the research (Blumer 1970), as well as theories that support such an ambition. Following John Dewey, this book has its focus in the classroom, that is learning, but connects this context to the individual as well as to the "real world" (Lyng and Franks 2002), which here means to care about what is happening outside the school (especially see Dewey 1922, which is considered to be an introduction to social psychology as well as Mead's *Mind, Self and Society*, 1934, which is also a classic text in social psychology). One very relevant theoretical proposition that elegantly demonstrates this tripartite construct is as follows: the realities of the world and the capacities of our own bodies are learned together (Gerth and Mills 1958; Lyng and Franks 2002). The character of this book is mainly social psychological but the brain/mind of the individual and the real world outside the classroom are not neglected. Overall, this tripartite construct can be seen as a kind of epistemic tool that hopefully serves the further advancement of knowledge for building a new theory for social problem-solving literacy. The role of this tripartite construct or epistemic tool in knowledge advancement becomes especially important because this is only the first of a series of subprojects (Scardamalia and Bereiter 2006). Simultaneously, I hope that this tripartite construct can play an organizing role and help readers to more easily see the content of each chapter and their connections to each other.

References

Aftonbladet, December 17, 2011 (Swedish daily newspaper).

Berman, S. (1997). *Children's social consciousness and the development of social responsibility*. New York: State University of New York Press.

Berman, S., & LaFarge, P. (Eds.). (1993). *Promising practices in teaching social responsibility*. Albany: State University of New York Press.

Blumer, H. (1970). What is wrong with social theory. In N. Denzin (Ed.), *Sociological methods* (pp. 84–95). London: Butterworth.

Clouder, C. (2008). Introducing social and emotional education. In C. Clouder (Ed.), *Social and emotional education. An international analysis* (pp. 21–42). Santander: Fundacion Marcelina Bootin.

Dewey, J. (1916/1944). *Democracy and education*. New York: The Free Press.

Dewey, J. (1922/2002). *Human nature and conduct*. New York: Dover Publications.

Gerth, H., & Mills, W. C. (1958). *From Max Weber: Essays in sociology*. New York: Oxford University Press.

Lima, M. (2014). *The book of trees: Visualizing branches of knowledge*. New York: Princeton Architectural Press.

Lyng, S., & Franks, D. (2002). *Sociology and the real world*. Lanham: Rowman & Littlefield.

Mead, G. H. (1934). *Mind, self, & society, from the standpoint of a social behaviorist*. Chicago: University of Chicago Press.

Meyer, R. (2008/2009). *Knowledge visualization*. Research paper. https://www.medien.ifi.lmu.de/lehre/ws0809/hs/docs/meyer.pdf

Scardamalia, M., & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge handbook of the learning sciences* (pp. 97–118). New York: Cambridge University Press.

Shier, M. (2011). Problem-solving and social work. In F. J. Turner (Ed.), *Social work treatment: interlocking theoretical perspectives* (pp. 364–373). Oxford: Oxford University Press.

Shoemaker, P. J., Tankard, J. W., & Lasorsa, D. L. (2004). *How to build social science theories*. Thousand Oaks: Sage.

Stallman, J. (2003). John Dewey's new humanism and liberal education for the 21st century. *Education and Culture, xx*(2), 18–22.

Tegran, S., & Keller, T. (2005). *Knowledge and information visualization*. Berlin: Springer.

UNICEF. (2014). *The state of the world children.* UNICEF.org.

Yousafzai, M. (2015). *I am Malala*. New York: Ponto Pocket.

Chapter 2
Open Research and Philosophical Reflections

Abstract This chapter provides a philosophical overview of this book. In line with many philosophers and scientists, I believe that even the most "strictly" social scientific research benefits from philosophical reflections. Philosophy can contribute to constructing the big picture and help to avoid getting lost in the details of empirical inquiries. The qualitative methodologist, Maxwell (*Qualitative research design: An interactive approach*. Sage, Los Angeles, p. 42, 2013), stated that although participants in the methodological "paradigm wars" in the social sciences each focused on the philosophical beliefs and assumptions of their own methodological communities, most of them saw the "philosophical positions as foundational" for research practices. Maxwell added that examples of such philosophical positions are positivism, constructivism, realism, postmodernism, and pragmatism. I choose pragmatism not only because this philosophy is very proper for experimental (intervention) research but also because of its emphasis on amelioration and change. In the *Need for Recovery of Philosophy*, Dewey (Creative intelligence: Essays in the pragmatic attitude. Henry Holy and Company, New York, 1917), one of the most well-known pragmatists, encouraged philosophers to be more than intellectuals who interpret past and present. Philosophy can work as effective equipment for a better life. "Philosophy does this by creating theories with meanings amenable to testing by application to human practices." (Hildebrand in Beginners guides on Dewey. Oneworld, Oxford, p. 207, 2008).

Keywords Philosophical reflections · Open research · Ameliorative beliefs · Pragmatism

This chapter is a philosophical overview of this scientific book. In line with many philosophers and scientists, I believe that even the most "strictly" social scientific research will benefit from philosophical reflections. Philosophy can contribute to constructing the big picture and help to avoid getting lost in the details of empirical inquiries. The qualitative methodologist, Maxwell (2013, p. 42), stated that although participants in the methodological "paradigm wars" in the social sciences each focused on the philosophical beliefs and assumptions of their own methodological communities, most of them saw the "philosophical positions as

foundational" for research practices. Maxwell added that examples of such philosophical positions are positivism, constructivism, realism, postmodernism, and pragmatism. I choose pragmatism not only because this philosophy is very proper for experimental (intervention) research but also because of its emphasis on amelioration and change. In the *Need for Recovery of Philosophy*, Dewey (1917), one of the most well-known pragmatists, encouraged philosophers to be more than intellectuals who interpret past and present. Philosophy can work as effective equipment for a better life. "Philosophy does this by creating theories with meanings amenable to testing by application to human practices" (Hildebrand 2008, p. 207). In the following pages (of this chapter), the characteristics of this research project and the "beliefs" that are basic to it are presented.

2.1   Characteristics of Open Research

Open research is the term that I have chosen to describe the characteristics of the scientific subprojects that I have been engaged in since 2009. These characteristics include

1. *Openness.* This concept is the opposite of rigidity or dogmatism. This quality refers to the process that research changes and develops whenever necessary and is based on three sources: (1) respect for the obdurate character of the empirical world, (2) methodological principles that underlie and guide the whole process of research; and (3) the framework of sensitizing concepts [these three characteristics get inspiration from Blumer (1970); more details are presented later]. At the same time, it is important to emphasize that openness means creating models that are preliminary and leave space for development.

2. *Open research (public research).* According to the Oxford Thesaurus (1992), one of the meanings of open is public. This project is called open research because, from the start, the project was presented in the local daily newspapers and became subject to critique by scholars as well as school practitioners. As Pring (2004, p. 134) put it elegantly "the research is conducted in such a way that others can scrutinize and, if necessary, question the practice of which it is a part." Others become part of the reflective process of the research.

3. *Open research (initiating the research project).* The word open has other meanings such as unsettled, receptive, and starting or initiating (Oxford Thesaurus 1992). This research project includes two subprojects: the first from 2009 to 2012 and the second from 2013 to 2014. This book is mainly the result of the analysis of the first subproject and, although it can be read as an independent project description, the general aim of these two projects is the same. The essential consequence of this openness—that is, unsettled, initiating, and receptive—also includes openness in theory and methodology. At the intersection of theory and methodology are the chosen sensitizing concepts, which

are basic, pregnant, or fertile, and leave a place for development in the other subprojects.

4. *Open communication with the readers*. Almost every researcher goes through a process that has its ups and downs, moments of joy and sadness, moments that include valuable learning. I am not sure that it is very common to write about these moments in one's book. However, I decided to briefly describe a few of these learning moments; they may be interesting for other researchers.

5. *Multidisciplinarity.* William James (1842–1910) has been a great influence on me with regard to multidisciplinary studies. He graduated from Harvard as a physician but started to teach physiology of the brain at a time when brain science did not exist as an academic discipline (neuroscience emerged many years later). After a while, he opened one of the first psychology laboratories at Harvard. Late in his career, he became active in pragmatist philosophy. This research project draws on philosophy, neuroscience, psychology, education science, social work, and sociology. This is a logical necessity, because the project is focused on learning, and learning is studied in several disciplines. Such an eclectic integration of theories and concepts from different disciplines has a better chance of success if it is guided by a philosophy.

6. *Philosophical.* The project draws particularly from pragmatist philosophy, which is appropriate for experimentalist research and can provide guidance and reflection during the research process (Reason and Bradbury 2006). As James (1907, p. 21) emphasized, pragmatism "unstiffens all our theories, limbers them up and sets each one at work."

7. *Ameliorative (and consequently political).* The aim of the project is based on the need for amelioration of social problems as well as child/youth rights as established in the United Nations Child Convention on the Rights of the Child. This aim strongly facilitates connection between university and community, between the researcher and practitioners outside university. At the same time, doing research connected to the Child Convention, which is a political document signed by states, gives the research "political teeth" (Martin and Kamberelis 2013), which facilitates realization of the project's aim in society (more about amelioration in the next section).

8. *Ambitious but disciplined through hard thinking.* I am aware that this project embraces an ambitious aim, and there is a risk of becoming blindly affected by one's desires and consequently becoming disappointed. However, as Kandel (2006) indicated, researchers can be ambitious and bold if they stick to scientific procedures. This demands a "disciplined" approach to research. From my point of view, such discipline, besides following methods of collecting and analyzing data, should provide benefit from at least four more qualities: (1) the researcher's patience for hard thinking (Kandel 2006), (2) some experience from intervention research, (3) a rich arsenal of relevant theories, and (4) having a methodology that guides the whole process of research (the "method" of hard thinking is developed in some detail in Chap. 10).

9. *Methodological.* All empirical and experimental inquiries have research methods that are described explicitly. But not all researchers explicitly explain whether they have followed a methodology or not. There is an important difference between methodology and methods. Methodology is not limited to methods of collecting and analyzing data but starts before collecting data and continues after data are analyzed. As Blumer (1970) emphasized, methodology is about the principles that underlie and guide the whole process of research. In this research, based on several methodologies (relevant for this project), I construct my own methodological principles.

10. *Interventionist.* To design a new literacy demands that it be developed in practice. This project intervenes in several school classes with the aim of designing/experimenting (e.g., see Cobb et al. 2003) in a program for social problem-solving literacy. New ideas demand experimental design and testing these ideas in the classroom.

11. *Participatory and cooperative.* Experiment in the classroom necessitates close cooperation between the researcher and the teacher/teachers. Even the pupils should develop a positive feeling about their participation in the project and realize that without their constructive contribution, the project will fail.

12. *Creativity and enjoyment.* In order to succeed in these 11 points, two other qualities are necessary: creativity and enjoyment. Research is demanding and often stressful so at least some of the time the researcher should be able to enjoy what she or he is doing, and this enjoyment is important for creativity. For me to leave the university and go to the schools once a week and work with energetic pupils has always been a stimulating, enjoyable, and valuable experience.

13. *Belief-based research.* This project is based on several "beliefs." These beliefs are described in some detail in the following section. The term belief is used here as a synonym for tenet or axiom. I searched on Google (22 May 2015) to find out how the word "belief" is used. I was not surprised to find 9,010,000 results for "religious beliefs," 193,000 results for "philosophical beliefs," and only 86,600 for "scientific beliefs." But this does not mean that we should stop using the term belief. What we have to do is to make clear what we mean by the word belief. Many scientists and philosophers use this term. For example, Lakoff and Johnson (1999, p. 3) wrote that "Our most basic philosophical beliefs are tied inextricably to our view of reason." So here belief is "tied" to human beings' capacity for reasoning and there is no connection between beliefs and "supernatural powers."

In my doctoral dissertation (Moula 2005), I raised the issue of the perspectivist understanding of reality and stated that no researcher is neutral; we are all influenced by some theories, concepts, and experiences, and I suggested that scholars can openly state their perspectives and facilitate a space for dialogue and critique. A decade later, I still think this is quite necessary for the advancement of research. The reminder of this chapter is an attempt to describe what I mean by the "beliefs" that influence this research project.

2.2   Ameliorative Beliefs and Scientific Research

Philosopher Campbell (1995, p. 99) distinguishes "three endeavors" in the work of those interested in bringing about change; the first is criticism of the present situation, the third endeavor is the introduction of proposals for bringing about change, and the second endeavor, lying between these two and justifying each, is a basic discussion of the nature of a fulfilled life. Campbell (1995) added that this second endeavor of social critics, the one that leads to deep conflicts among them, is the specification of the "good" or the content of the change. Following this argument, this book is based on (1) observation of the problematic situation of our world, (2) an attempt to construct the basics of a new kind of literacy that teaches pupils social problem solving at individual and collective levels for ameliorating problematic situations, and (3) the belief that the United Nations Convention on the Rights of the Child accompanied by science and philosophy is a proper framework that gives us guidance and direction for creating necessary changes.

The Child Convention is not based on the personal values or beliefs of some individuals or groups who want change. It is an international document that took 10 years (from 1979 to 1989) to produce, and many experts from many countries participated in writing it. At present, almost all countries in the world have ratified it, and they are encouraged to realize it in their countries. These countries should continuously report to the United Nations on their successes and failures in realizing this convention. UNICEF, the largest and most powerful child organization in the world, is the main international union responsible for realization of this human right treaty.

> There is a need for more researchers, from doctoral students to more experienced scholars to put time and energy into discovering resources and barriers impeding the realization of the Child Convention. There is an international belief that realization of this Convention leads to a much better situation for all the world's children and, since children are the world's future, so its realization means creating a better present as well as a better future for the world.

This ameliorative belief is the first belief on which this book is based.

The second belief is also based on the Child Convention, but specifically on Article 29, which is about the direction of school education and includes pupils' right to optimally develop their mental capacities and schools' obligation to prepare pupils to have social responsibility. This belief, if it becomes a public belief, can put pressure on governments that have ratified this document to take the necessary steps to realize it.

The third belief is based on the opinion that philosophical reflections (particularly pragmatist philosophy) and scientific insights are the best tools for interpreting the Child Convention and, through intervention research, taking the first steps to

create programs or models for actualizing the Child Convention (here the focus is on Article 29 of this Convention).

The fourth belief is based on a recent movement whereby a large number of researchers and child practitioners are engaged in a kind of "emotional and social education" in various countries, suggesting that this education should become part of a school curriculum (Clouder 2008). This movement strongly connects its activities with the Child Convention and suggests that such an education is essentially part of the realization of this international document. Children should learn more than mathematics, chemistry, physics, and other traditional subjects at schools. They should learn how to express and manage their emotions and regulate their social relationships (Clouder 2008).

The fifth belief is based on the opinion that John Dewey's educational philosophy, together with many recent interpretations of his work, is a proper tool for creating emotional and social education in schools. John Dewey is North America's most popular philosopher with a huge number of much cited publications and internationally considered as "the father of progressive pedagogy" (Malten 1981). He is called the philosopher for the 21st century (Pring 2007; Samuelson 2012) or the pioneer of qualitative methodology for educational psychology in our era (Rosiek 2013). Dewey's method is "critical and cooperative" but his interest is social and educational (Campbell 1995, p. 22).

The sixth belief is based on the opinion that neuroscience, the most rapidly expanding science over the last 40 years, can help us to enrich emotional and social education. In 1971, only 1100 scientists participated in the first annual meeting of the Society for Neuroscience. In 2006, the number of scientists convened at the 36th annual meeting was 25,785 (Squire et al. 2008). Neuroscience can indeed help us to better understand the relationship between cognition and emotion. Reason is always passionate (Lakoff and Johnson 1999). Recent discoveries on the prefrontal cortex show us that what many scholars call social and emotional education should indeed be called cognitive, social, and emotional education. It is the aim of this book to connect the Child Convention's emphasis on every child's right to optimal mental development to neuroscience and get help from this science to interpret what optimal mental development means.

The seventh and final belief on which this book is based is related to the fifth and sixth beliefs and the opinion that an integration of pragmatism and neuroscience can enrich cognitive, emotional, and social education. A group of philosophers, social scientists, cognitive scientists, and neuroscientists have started to organize themselves and, in their first steps, they have produced works based on the integration of pragmatism with neuroscience. The author of this book is among the first scholars who have produced texts about this integration, often referred to as neuropragmatism (Moula 2009, 2011; Moula et al. 2009, 2010, 2014).

Neither the nature of these seven beliefs nor the strengths or sizes of the various populations that carry the respective opinion are the same. For example, the first and second beliefs, which are connected to children's rights, are an obligation of states with UNICEF, a very powerful organization, financially, politically, and scientifically supporting realization of these two beliefs. But the seventh belief is

limited to a small but growing group of scholars. Cognitive scientist and philosopher, Thagard (2002, p. 5), emphasized that a "belief is justified not because it is indubitable or is derived from some other indubitable beliefs, but because it coheres with other beliefs that jointly support each other." These seven beliefs on which this book is based fit together very well and support each other. They form a rather all-inclusive union based on international convention (or law, because in Finland, Norway, and Belgium, the Child Convention is law, and a wide discussion is going on to make it law in Sweden), philosophy, social science, and neuroscience. Doubt is an uneasy and dissatisfied state, but belief is a calm and satisfactory state. Human beings, as individuals or groups, need to develop their doubts into beliefs. Although we always live with some doubts, puzzles, and questions, too many doubts disturb our daily activities. People use different resources to develop doubts into beliefs necessary for action. These resources can be religion, cultural norms, or authoritative individuals. However, as researchers we should develop doubts into beliefs by accompanying beliefs with observations (facts) and not sole wishes. To achieve this, we use scientific methods.

Pragmatists including Dewey and Mead presented meliorism (or ameliorism) as the belief that this life is neither good nor bad; it can be improved through human effort.

This is no blind faith, tossed off by Dewey; it is a working hypothesis, drawn from experience. "To accept the challenge implied by the melioristic hypothesis is to admit that the proper purpose of intellectual inquiry is to search for ways (ideas, practices) to improve *this* life rather than to look for absolute value or reality per se." (Hildebrand 2008, p. 5, emphasis in original).

Meliorism encourages deliberate and purposeful action, which pessimism cannot, and arouses confidence and hopefulness without relaxing us into optimistic passivity. "Only a meliorism can underlie a philosophy of action that allows for the possibility of reform and progress through human effort" (Campbell 1995, p. 261). What I mean by ameliorative beliefs is to emphasize on opinions that focus on change and social problem solving.

Neuroscientists Asp and Tranel (2013, p. 405) stated that "the notion that emotions determine beliefs has been a common assumption during much of human history." As James (1890/1981) claimed, in its inner nature, belief, or the sense of reality, is a sort of feeling more allied to emotions than anything else. According to James (1890, p. 913) belief means "every degree of assurance, including the highest possible certainty and conviction." James emphasized the influence that emotions exert on belief and indicated that some refer to belief as emotion of conviction. Then the question that arises is, if belief is so tied to emotions, can we build our scientific research on beliefs? The answer is that scientific activities cannot be judged by science itself; they have to be judged by some beliefs or values. The atom bombs used in Hiroshima and Nagasaki, which killed about 200,000 Japanese, were made by the latest scientific discoveries of mankind. Atomic power can be used for human welfare or human destruction; that is, creating electricity or atom bombs. According to Dewey, science is impersonal; it owes its operation and its consequences to the human beings who use it. It adapts itself passively to the purposes

Fig. 2.1 The three sources that make up the ameliorative triad of these research subprojects: the Child Convention, scientific insights, and philosophical reflections. Together they effectively influence the design of an intervention program for a new kind of literacy in schools
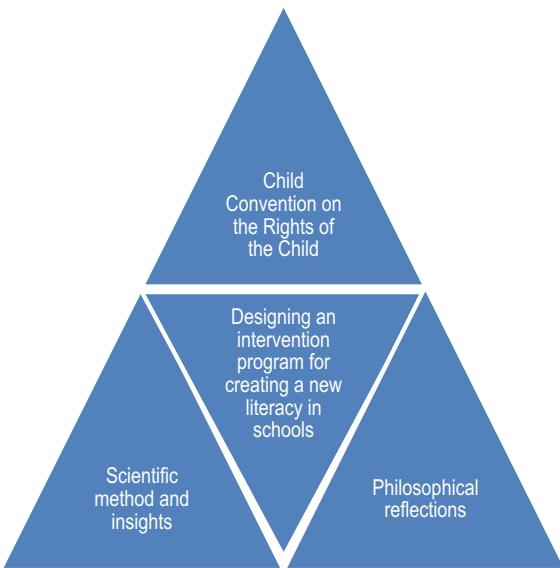
and desires that animate these human beings. It lends itself with equal impartiality to the kindly office of medicine and hygiene and the destructive deeds of war. It elevates some by opening new horizons; it depresses others by making them slaves of machines operated for the pecuniary gain of their owners (Campbell 1995, pp. 104–105).

Campbell (1995, p. 105) concluded that the ends to which the power of science is put are not to be found in science itself, and this fact makes the role of the inquirer ever important. "The actual uses to which the power of science is put are based in our choices of fundamental human values." Figure 2.1 visualizes what I call the ameliorative triad.

References

Asp, E., & Tranel, D. (2013). False tagging theory: Toward a unitary function of prefrontal cortex. In D. Stuss & R. Knight (Eds.), *Principles of frontal lobes functions* (2nd ed., pp. 384–416). New York: Oxford University Press.

Blumer, H. (1970). What is wrong with social theory. In N. Denzin (Ed.), *Sociological methods* (pp. 84–95). London: Butterworth.

Campbell, J. (1995). *Understanding John Dewey*. Chicago: Open Court.

Clouder, C. (2008). Introducing social and emotional education. In C. Clouder (Ed.), *Social and emotional education. An international analysis* (pp. 21–42). Santander: Fundacion Marcelina Bootin.

Cobb, J., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiment in educational research. *Educational Researcher, 32*(1), 9–13.

Dewey, J. (1917). The need for recovery of philosophy. In J. Dewey & A. Webster Moore (Eds.), *Creative intelligence: Essays in the pragmatic attitude* (pp. 3–69). New York: Henry Holy and Company.

Hildebrand, D. (2008). *Beginners guides on Dewey*. Oxford: Oneworld.

James, W. (1890/1981). *The principles of psychology*. Cambridge, MA: Harvard University Press.

James, W. (1907). *Pragmatism*. New York: Dover Publications.

Kandel, E. R. (2006). *In search of memory: The emergence of a new science of mind*. New York: W.W. Norton.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh*. New York: Basic Books.

Malten, A. (1981). *Vad är kunskap?*. Malmö: Liber Läromedel.

Martin, A., & Kamberelis, G. (2013). Mapping not tracing: Qualitative educational research with political teeth. *International Journal of Qualitative Studies in Education, 26*(6), 668–679.

Maxwell, J. (2013). *Qualitative research design: An interactive approach* (3rd ed.). Los Angeles: Sage.

Moula, A. (2005). *Population based empowerment practice in immigrant communities* (Medical dissertation 887). Linköpings universitet.

Moula, A. (2009). *Empowermentorienterat socialt arbete*. Lund: Studentlitteratur.

Moula, A. (2011). An invitation to empowerment-oriented neurosociology. In B. M. Pirani (Ed.), *Learning from memory: Body, memory and technology in a globalizing world* (pp. 234–266). Newcastle upon Tyne: Cambridge Scholars Publishing.

Moula, A., Mohseni, S., Starrin, B., Scherp, H. A., & Puddephatt, A. J. (2010). The intelligent method of learning. *Culture and Development, 19*(3), 26–31.

Moula, A., Puddephatt, A., & Mohseni, S. (2014). A neuropragmatist framework for childhood education: Integrating pragmatism and neuroscience to actualize Article 29 of the UN Child Convention. In T. Solymosi & R. Shook (Eds.), *Neuroscience, neurophilosophy, and pragmatism: Brains at work with the world* (pp. 215–239). UK: Palgrave Macmillan.

Moula, A., Timpka, T., & Puddephatt, A. (2009). Adult–adolescent interaction and adolescents' brain development: Integrating pragmatism/interactionism and neuroscience to develop a platform for research on adolescents' life regulation. *Sociology Compass, 3*(1), 118–136.

Pring, R. (2004). *Philosophy of educational research*. London: Continuum.

Pring, R. (2007). *John Dewey: A philosopher of education for our time*? London: Continuum.

Reason, P., & Bradbury, H. (2006). Preface. In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. xxi–xxxii). London: Sage Publications.

Rosiek, J. (2013). Pragmatism and post-qualitative futures. *International Journal of Qualitative Studies in Education, 26*(6), 692–705.

Samuelson, C. L. (2012). *John Dewey and his implications for the 21st century scholar* (Doctoral dissertation). Bethel University, Ann Arbor.

Squire, L., Bloom, F. E., Spitzer, N. C., Squire, L. R., Berg, D., Bloom, F., et al. (2008). *Fundamental neuroscience* (3rd ed.). Amsterdam: Elsevier.

Thagard, P. (2002). *Coherence in thought and action*. London: MIT Press.

Urdang, L. (1992). *Oxford thesaurus* (American edn.). New York: Oxford University Press.

Chapter 3
Building a Framework for Sensitizing Concepts

Abstract Pring (*Philosophy of educational research*. Continuum, London, 2004, p. 23) presents a holistic and philosophical approach to educational research and warns us that complexity of concepts and their relationship to each other should not push us toward reductionism. One way to take Pring's warning seriously is to take some concepts and put them under explicit theoretical and empirical scrutiny. These should be basic concepts and abstract enough to allow space for reflection and development. Blumer (What is wrong with social theory. *Sociological methods*. Butterworth, London, pp. 84–95, 1970, p. 91) invented the term sensitizing concepts to distinguish them from definite concepts. "Whereas definite concepts provide prescription of what to see, sensitizing concepts merely suggest direction along which to look." Social researchers tend to use sensitizing concepts as an interpretive tool and as a starting point for a qualitative study (Bowen in *Int J Q Methods* 5(3):12–23, 2006). Therefore, sensitizing concepts are a target for empirical inquiry and can be refined (Blumer in What is wrong with social theory. *Sociological methods*. Butterworth, London, pp. 84–95, 1970). The conceptual framework presented here includes sensitizing concepts that are based on (1) our previous studies (colleagues and I) aimed at creating a neuropsychosocial framework for youth studies, (2) observations mentioned in the introduction, (3) the Child Convention, (4) pragmatist educational philosophy, and (5) knowledge of neuroscience about mental capacity. These concepts are capacity, being, becoming, authority, and responsible citizenship. Together they help to create an intervention package suitable for creating a new literacy in schools.

Keywords Capacity · Being · Becoming · Authority · Responsible citizenship

Pring (2004, p. 23) stated that research into teaching and learning "suffers" from the problem of reduction for the sake of measurable simplicity. This philosopher's work (Pring 2004, 2007) presents a holistic approach to education and educational research and warns us that complexity of concepts and their relationship to each other should not push us toward reductionism. Therefore, we should have a research strategy to cope with this complexity in an intervention research.

3.1   The Five Sensitizing Concepts

One way to take Pring's warning seriously is to take some concepts and put them under explicit theoretical and empirical scrutiny. These should be basic concepts and abstract enough to allow space for reflection and development. Blumer (1970, p. 91) invented the term sensitizing concepts to distinguish them from definite concepts. "Whereas definite concepts provide prescription of what to see, sensitizing concepts merely suggest direction along which to look." Social researchers tend to use sensitizing concepts as an interpretive tool and as a starting point for a qualitative study (Bowen 2006). Therefore, sensitizing concepts are a target for empirical inquiry and can be refined (Blumer 1970). The conceptual framework presented here includes sensitizing concepts that are based on (1) our previous studies (colleagues and I) aimed at creating a neuropsychosocial framework for youth studies (Moula et al. 2009, 2014), (2) observations mentioned in the introduction, (3) the Child Convention, (4) pragmatist educational philosophy, and (5) knowledge of neuroscience about mental capacity. These pregnant concepts are capacity (to be precise I am talking about capacity development or capacity building), being, becoming, authority, and responsible citizenship. Together they help to create an intervention package suitable for creating a new literacy in schools.

I first give a simple dictionary-like definition and then develop these concepts step by step by referring to the sources I mentioned (the Child Convention, pragmatism, and neuroscience). What connects these three perspectives to each other is their focus on understanding through practice/experiment. Together they give us a neuropsychosocial perspective and each is accepted as an authority in its own field. Each section concludes with an experimental proposition for design research. A more refined theoretical proposition based on the intervention appears later. Since capacity is at the heart of all other concepts, let us start by defining it. According to the Oxford Thesaurus (1992), the word capacity has three sets of meanings: (1) size, volume, space; (2) capability, competence, skill; (3) position, condition, responsibility, duty. These three sets of meanings can be connected to the biological, psychological, and social dimensions of capacity, respectively. We start from the three-dimensional term of capacity and the fact that humans are biological, psychological, and social beings. But the intention of building capacity brings us to the question of what we want to build on, we cannot build on nothingness; there should be a base to build on. This brings us to our second concept: being. This concept provides a basis for studying some main characteristics of human beings. What is our common human capacity that we should/could build on? Since I have a neuropsychosocial perspective, the focus is on the unique capacity of the human brain relevant to our purpose here: mental development. Now we are talking about becoming. The concept of becoming builds on the concepts of being and capacity.

The main body of this book is devoted to how pupils learn to develop their mental capacity and become prepared to perform social responsibility. The issue of who decides which direction we should or could guide pupils' mental development brings us to the concepts of authority and the direction of development. The concept of authority, or legitimate power, sensitizes us toward paying attention to powers behind capacity development. Authority, just like capacity, is a neuropsychosocial concept. First, the biological or the internal power resides in each human being's brain. Here, we need some selected knowledge of the brain that is relevant for our purpose. The other dimension, the psychological dimension of authority, is related to the idea that each pupil becomes conscious that he or she is the most important person in her or his own life. This psychological dimension of authority has to do with how we can empower each pupil. The third dimension is about relationships as authority and includes both the relationships between pupils and the relationship between pupils and the teacher. Finally, the concept of responsible citizenship sensitizes us toward pupils' roles in society.

These concepts are so basic that they can play an important role in many educational studies, either explicitly or implicitly. In the following quotation from Richard Pring (2004, p. 24), we see the relevance of these concepts for educational research and their relationships to each other.

> Educational research, therefore, should centrally, but not exclusively, be about those transactions between teacher and learner[1] in which are developed the capacities, skills, understandings and modes of appreciation[2] through which the learner comes to see the world[3] in a more valuable way. (Numbers are added)

The three markers are added here to illustrate the tripartite construct (the individual, interaction/relationships, and the world). The first number, which according to Pring should be the center of research, is what happens between the teacher and the pupils. Learning is the interesting concept that connects teacher to pupils and orients pupils to the world and reminds us of Gerth and Mills (1958) statement that the realities of the world and the capacities of our own bodies are learned together. The second marker is about how pupils develop their capacities and focuses on pupils as individuals, and the third is about their orientation in the world. Pring (2004) emphasizes that, for teachers, the development of persons (i.e., pupils as persons) should be a crucial issue in the classroom (more about the concept of "person" appears later). In the coming sections, several models are built: a model for the Child Convention, one for the capacities of the prefrontal cortex, one for the concept of a person, one for social problem solving, and one for learning. What is meant by a model is simply "A preliminary work or construction that serves as a plan from which a final product is to be made" (www.thefreedictionary.com, 2016-11-25). This concept of a model allows development or improvement of the concepts within the model and does not bind them to a fixed idea.

3.2 What Should Be Done? Building an Ameliorative Model from the Child Convention's Directives

The Convention on the Rights of the Child is the most widely ratified convention in history. The convention changed the way children are viewed and treats them as human beings with a distinct set of rights instead of passive objects of care and charity. The world needs new ideas and approaches, and the convention must become a guiding document for every human being in every nation (http://www.unicef.org/crc/, 27 September 2014). My approach to the Child Convention includes two main areas of focus: (1) the Child Convention is an ameliorative document that aims to gradually improve the situation in the world by focusing on children's rights; children are understood as both living, acting human beings and as future adults; (2) this gradual amelioration takes place from the top, by the 193 states that have ratified the Convention, and should take place from the bottom by all the world's children. All these states report systematically to the United Nations on their actions. Putting pressure on the states to improve children's rights is what I call amelioration from the top. At the same time, the Child Convention, through several core articles, emphasizes the role of children as the agents of change (e.g., see Article 12). This is what I call amelioration from the bottom. These two ameliorative acts complete each other. This book's focus is on how children learn to develop their capacities to be become agents of amelioration and the emphasis is on Article 29 of the Child Convention, which is about the direction of school education. Schools are a bridge between pupils (and of course their brains) and their societies.

The Convention is compatible with the position known as sociology of childhood (James and Prout 2014), which involves creating a balance between being a child and enjoying the life of childhood while learning and developing for adult life. According to the Child Convention, a child (a person less than 18 years old) is a being with the right to learn not only literacy and numeracy but also basic skills "to make well-balanced decisions; to resolve conflicts in a nonviolent manner; and to develop a healthy lifestyle, good social relationships and responsibility, critical thinking, creative talents, and other abilities which give children the tools needed to pursue their options in life." But who has the main responsibility for these developments? "Schools should foster a humane atmosphere and allow children to develop according to their evolving capacities." Article 29 emphasizes the need for education to be designed and provided in such a way that it promotes and reinforces the range of specific ethical values enriched in the Convention, including education for peace, tolerance, and respect for the natural environment, in an integrated and holistic manner (United Nations 2001). The final point, which is important for this project, is about the mess that adults have created and for many reasons have difficulties in ameliorating; messes such as ethnic or religious wars. At the time of writing this book, the Middle East is burning and children are the main victims of these conflicts and wars. However, in proper circumstances, children "are capable

of playing a unique role in bridging many of the differences that have historically separated groups of people from one another" (United Nations 2001). Considering our sensitizing concepts, the Child Convention helps to build our first proposition.

> Experimental Proposition 1: The United Nations Child Convention and especially Article 29 demands that schools integrate pupils' social and cognitive development and facilitate pupils'
>
> - mental development to their "fullest potential"
> - learning of basic skills to make well-balanced decisions, and
> - preparation for performing social responsibility

In the two next sections, these capacities and concepts are interpreted further with the help of neuroscience and pragmatist philosophy.

3.3 What Could Be Done? Building a Model for Thinking from Neuroscientific Insights

The human brain is the most complex adaptive system in the universe (Siegel 1999). Knowledge of the brain is crucial for the neuropsychosocial perspective presented in this book. Kandel (2006) described this structure as follows: the brain is a complex biological organ of great computational capability that constructs our sensory experiences, regulates our thoughts and emotions, and controls our actions. The brain is responsible not only for relatively simple motor behaviors, such as running and eating, but also for the complex acts that we consider quintessentially human, such as thinking, speaking, and creating works of art. The brain leads the interaction of the organism with the environment.

The brain has distinct functional regions (Kandel et al. 2013, p. 9). For example, vision is associated with the visual cortex located at the back of the brain, hearing is associated with the auditory cortex close to our ears (temporal lobe), and language is associated with two regions, named the Wernicke and Broca areas. The brain has a region called the prefrontal cortex located at the anterior part of the frontal lobes. The Great Russian neuropsychologist, Alexander Luria, called the prefrontal cortex the biological site of civilization (Goldberg 2001). The prefrontal cortex sits at the highest cortical level of the perception-action cycle, from which it regulates the interactions of the organism with its environment (Fuster 2008). Years of study of patients who had prefrontal damage and studies of this part of the brain through neuroimaging technology in human beings have provided a good amount of knowledge about the main functions of the prefrontal cortex (Mesulam 2002). These main functions are summarized here through reference to some of the

literature by experts on the prefrontal cortex. This summary is selective and is limited to the aim of this book. Asp and Tranel (2013), in an impressive review of research on the prefrontal cortex, present the theory that this part of the brain gives us the capacity to doubt and question what is in front of us. This capacity is vital for developing curiosity and creativity in children and youth. The prefrontal cortex gives a person the possibility to trust the power within (herself or himself) and to question or examine various issues in the environment (let us call this capacity of the prefrontal cortex one's own authoritative thinking).

Thanks to the prefrontal cortex, the human brain develops a prospective temporal dimension. Thereby, it makes advanced long-term adaptive changes in its environment. The prefrontal cortex confers on the human brain the capability to predict and, accordingly, to preadapt. "Preadaptation implies anticipating, planning, decision making and organizing goal-directed action in the time axis" (Fuster 2013a, p. 11) (let us call this capacity of the prefrontal cortex preadaptive thinking).

Mesulam (2002, p. 26), in an excellent description relevant for our task, wrote that the prefrontal cortex gives us the capacity for reflection, change, and choice, but the prefrontal cortex does not specify "the nature of choices, the contents of the reflection or the direction of the changes" (let us call this capacity of the prefrontal cortex reflective thinking). It remains for society, parents, and especially schools to provide guidance so that pupils can develop their capacity for reflection, change, and choice.

> What I—not as a neuroscientist but as a social researcher and possibly a neurosociologist—have been emphasizing, rather uniquely, during the last several years is not a popular phrase like "use your brain," rather how to focus on a specific neurobiological capacity to develop it consciously and in a goal-oriented fashion within a well-planned context (Moula 2009, 2011; Moula et al. 2009, 2010, 2014).

Neuroscientists do not deny the role of social factors in their biological studies. For example, the neuroscientist Damasio (2010, p. 294), emphasized that "Biology and culture are thoroughly interactive." And the neuroscientist and psychiatrist Wexler (2006) devoted a complete book to *Brain and Culture: Neurobiology, Ideology, and Social Change.* Wexler wrote that

> In this book I present an extensive array of neurobiological, psychobiological, and psychological research data that provide a rich picture of the relationship between the biological and the social. These data demonstrate that our biology is social in such a fundamental and thorough manner that to speak of a relation between the two suggests an unwarranted distinction. (Wexler 2006, p. 13)

But unfortunately social scientists do not show much interest in neuroscience and probably are worried that the quick expansion of neuroscience downplays the role of social science. I am suggesting that social scientists should be "bold" (remember Kandel's quotation at the beginning of this book) to learn from neuroscience but apply it as social scientists in their research with their own theories and methods. And, hopefully, neuroscientists do not claim monopoly over neuroscientific knowledge and assert that scholars who do not have neuroscientific training cannot use neuroscientific knowledge. Fortunately, there is a rapidly growing academic movement in psychology, psychiatry, education science, and even among a few sociologists who are integrating neuroscience with their own disciplines (see the collection of essays edited by Solymosi and Shook 2014). At this point, we can formulate the second proposition:

> Experimental Proposition 2: It is possible and desirable for schools to acknowledge the capacity of pupils' prefrontal cortex and, through specific programs, work toward actualization of this capacity. At the heart of this capacity is what I call triple thinking, which is crucial for optimum sociocognitive development. This triple thinking includes
>
> - *Every pupil's own authoritative thinking*: discovering and trusting the authority within and daring to examine established authorities of any kind in one's environment
> - *Reflective thinking*: reflecting on how the things are and how they can be (i.e., thinking in order to reflect, especially for making choices and bringing about changes)
> - *Preadaptive thinking*: which implies anticipating, planning, decision making, and organizing goal-directed action in the time axis

According to New Webster Dictionary (1992), optimum means most favorable or best possible for a certain purpose, or under certain conditions. According to neuroscience, the prefrontal cortex is the authority within that has the neurobiological position and the capacity to play a regulating role and organize human beings' emotions, thoughts, and behavior. Just this capacity can be connected to what the word optimum means in optimum sociocognitive development. I interpret optimum as the prefrontal cortex's capacity to organize other capacities such as emotion and behavior. This principle is widely used in cognitive (behavioral) therapy.

Optimum sociocognitive development can facilitate development of the "basic skills" in pupils. Development of these skills is demanded by the Child Convention and is necessary to prepare pupils to become socially responsible citizens.

3.4   How to Do It? Building Models for the Classroom Context

In this section, I build three models that together provide a context in the classroom. The first focuses on the pupil as a person, the second on the role that a problem-solving model can play in this context, and the third focuses on learning.

3.4.1   How to Do It? Building a Model for Understanding Pupils as Persons

Pring (2004, pp. 18–19) develops the concept of person (think of being) and personal development (think of becoming) for educational research. Accordingly, (1) the concept of person presupposes a form of consciousness, a capacity to experience the world, not merely to interact physically with it. That consciousness is formed by different forms of understanding. These can be ever more refined by learning. (2) One aspect of that understanding of the world is the recognition of other people as persons; that is, as centers of consciousness in their own right. (3) A person with such understanding has the capacity to relate to other people. (4) The quality of personal life depends on social relationships and the institutional arrangements that support them. Responsibility for one's own life extends to responsibility for the social context of that life, and that requires the skills and knowledge to take an active part in society. In that sense, persons are political animals, capable of shaping the social environment. Therefore, the concept of person implies the capacity to accept social responsibility for self and others.

Such a characterization of what it is to be a person stresses the various, although interrelated, capacities that may or may not be actualized through education. Pring illustrates this point by referring to adolescence:

> Adolescence, in particular, is a period in which young people seek to find their distinctive identities—the sort of persons they are or might become, the ideals that are worth striving for, the qualities that they wish to be respected for, the talents that need to be developed, the kind of relationship in which they will find enrichment, the style of life that is worth pursuing. (Pring 2004, p. 19)

The crucial point that Pring, in line with Dewey (1916, 1922), emphasizes is that the capacities of youth are dependent on learning. Without learning, one remains ignorant and powerless unless, through learning, one acquires the concepts and knowledge that dispel that ignorance and enable one to understand oneself and others, as well as one's obligations and responsibilities. Another point that is important to mention here is that pragmatists emphasize that these learnings should be repeated to the point that they become the habit of mind. On this point, William James has been quoted by many youth psychologists:

The great thing, then, in all education, is to make our nervous system our ally instead of our enemy. It is to find and capitalize our acquisitions, and live at ease upon the interest of the fund. For this we must make automatic and habitual, as early as possible, as many useful actions as we can… Could the young but realize how soon they will become mere walking bundles of habits, they would give more heed to their conduct while in plastic state. (James 1890/1981, pp. 126–130)

At this point I can formulate the next proposition:

> Experimental Proposition 3: Pupils as persons have inherent capacity to take social responsibility but these capacities should be developed through learning/training in schools to the point so they become the habits of mind.

3.4.2   How to Do It? Building a Model for Social Problem Solving

During the last 20 years, I have been working as a social worker, a researcher, and a university educator of social work. At the heart of all these activities was the intention to empower people. We (my colleagues and I) have defined empowerment as helping people to discover and enhance their sociocognitive powers in order to reach their own goals (Moula 2005, 2009; Addelyan Rasi et al 2012a, b; Addelyan Rasi 2013; Moula and Addelyan Rasi 2014; Addelyan Rasi and Moula 2015). These intervention studies in two very different countries (Sweden and Iran) have led to the following conclusions:

(a) Many individuals (youths, adults) are not well aware of the authority within, therefore, to solve their problems, they often appeal to authority without.
(b) Through education, people can learn to better understand, appreciate, focus on, and enhance this internal authority.
(c) During such an education, a crucial process can emerge; an external mental tool can be internalized. A problem-solving model including a system of a few basic concepts can be learned and used over a period of time so that it becomes a habit of mind.

These three conclusions, which I call the ABCs of empowering (neuropsychosocial) individuals, get support from the theories of Vygotsky (1978), James (1890, 1899), and Dewey (1910, 1922, 1938) and recent knowledge of neuroscience. Mead (1934) called this internal and external organization of action. This is also in line with cognitive theory; for example, Norman Cobb (2008) refers to this as organization of covert and overt behavior. To organize means to form a whole consisting of interdependent parts, or arrange the parts so that they work as a whole (American College Dictionary 1947; New Webster Dictionary 1992).

In other words, through such an education, individuals can optimally activate, work with, and enhance the capacity of the prefrontal cortex to organize their thoughts, feelings, and actions.

Now, on the basis of the ABCs of empowering people and the three experimental propositions, I can attempt to prepare a focus point for creating a classroom context. The suggestion is that social problem solving can be an effective focus point that facilitates testing of these three propositions. Social problem solving is an amazing concept. First, this concept is truly sociocognitive. It requires the individual's cognitive capacity to solve social problems. Second, this concept is crucial for connecting the individual to the environment. Pragmatist philosophers emphasize problem solving as the key link between human beings and their environment (Dewey 1922). Researchers and practitioners in social work have for many years used problem solving from a "person-in-environment" perspective (Coady and Lehman 2008). The third important characteristic of this concept is that it is vital for survival and well-being at all levels: individual, group/family, community, country, and even our planet. The fourth important characteristic of problem solving is that it engages the whole individual in this activity. The individual's cognition, emotion, motivation, and relationships are all part of the process of problem solving (see Fig. 3.2). The fifth characteristic, and the result of the other four, is that it helps us to escape the dualism between individual and society. A problem for an individual or individuals creates a problem for society and vice versa. Focusing on problem solving helps advancement of both individuals and society. The sixth characteristic points to the issue that social problem solving has helped many psychologists, social workers, parents, and teachers to empower children and youth by telling them that you are not the problem but you can solve the problem (see Free the Children, Chap. 1).

For Dewey, much of life is about the process of meeting problems and attempts to solve them. In these processes of addressing problems, Dewey believed that as one problem is solved, a new one emerges. There is no such thing as final settlement, because every settlement introduces conditions with some degree of unsettling (Campbell 1995). In order to identify some details of the cognitive process during problem solving, some known problem-solving models are presented here. Table 3.1 shows four known problem-solving models. In order to make comparison possible, the most common features of these models have been selected.

It is possible to coin the steps of these models by a few major concepts: step 1 of these models is about description of the situation and definition of one or more problems at the heart of it, which we can coin with the concept of reality comprehension. Steps 2 and 3 are about change and consideration of possibilities for creating change. Step 4 is about choosing the best option and planning for action. And finally step 5 of the models is about evaluation.

Concluding this section, I suggest that social problem-solving activity of pupils can actualize their capacities that the Child Convention demands. Therefore, creating a classroom context in which pupils' activities are organized around social problem solving can be a focus point for cognitive, social, and emotional education.

Table 3.1 The similarities of different problem-solving models

Philosophy	Psychology	Social work	Neuroscience
A felt difficulty	Problem orientation	Identifying the problem with emphasis on the personal experience of the person who wants to solve the problem	Problem representation
Identifying location and defining that difficulty	Problem definition and formulation	Examining the cause and effects of the problem in the person's life	
Suggesting possible solutions	Generating alternatives and identifying as many solutions as possible	Considering the pros and cons of various courses of action	Planning
Reasoning about the possible consequences of the suggestions	Decision making	Choosing and enacting a course of action	Execution
Experiment leading to acceptance or rejection of the suggestion (Dewey 1910)	Solution implementation (self-monitoring and evaluation) (D'Zurilla 1986; D'Zurilla and Goldfried 1971)	Assessing the effectiveness of the chosen action (Perlman 1957; Shier 2011)	Evaluation (Zelazo et al. 1997; Zelazo and Muller 2014)

The steps of a general social problem-solving model
In this section, I present some details for a general problem-solving model that can be used by both adults and pupils.

Step 1 Thomas and Thomas (1928) wrote that if individuals define their situations as real, they are real in their consequences. This known sociological theorem connects people's understanding of situations to their construction of action and the subsequent consequences. Others may help to shape the definition of the situation but concerned individuals, themselves, are at the center of this interpretive phase. We can compare this dialogical process of mutual definition—dialogue with self and/or others—with a funnel. Thoughts that may be general or ambiguous in the beginning become more and more specific. Somewhere near the bottom of the funnel, we arrive at the final definition of a concrete situation or problem.

Step 2 Dialogue (with self and/or others) continues and the individual tries to imagine the desirable situation. The desirable situation is connected to the present situation or problem as defined in step 1. It is possible that the dialogue (in step 1) cannot lead to definition of the problem, but when the individual talks about the desirable situation (in step 2) and what she/he wants, then it becomes clearer what she/he does not want. Thus, we need not adhere to the chronology of these steps too strictly, and should remain flexible about their order. Furthermore, an individual may think of several desirable situations. In this case, the next step

would be to ask which desirable situation is most possible from a practical point of view.

Step 3 Through learning the model, pupils try to imagine several alternatives for action. First, all possible alternatives should be found without any attempt to rank them. Then, the youth are asked to consider barriers and resources for each alternative. Finally, the consequences of each alternative should be examined very carefully. Only at this stage can the individual rank the alternatives. Sometimes we have 3 or 4 alternatives and for each alternative we have to look at barriers, resources, and consequences. This is the step of the model that demands a great deal of thinking and patience.

Step 4 After the pupil has selected an alternative, he or she can plan for action with the necessary details in place.

A few general thoughts on the model

It encourages youth to put reflective thinking at the heart of their daily performances. Saleebey (2002) believes that the greatest good you can do for another is not just to share your own riches but to reveal people's own strengths to them. Dewey (1910, 1938) believes that cultivation of our own reflective intelligence is of the utmost importance to our development and well-being, and that nothing can prevent us from using this intelligence in our daily lives. For Dewey, intelligence has to do with remaking of the old through union with the new. This model is an intelligent decision-making and problem-solving model for two reasons: (a) it connects the past and present to the future; and (b) it compares different alternatives in a deliberative manner before acting. These habits of continual comparison, reflection, evaluation, and choice increase the intellectual capacity of individuals in their daily life performances. There are often no easy or quick solutions to the problems presented in life, and this model helps to raise the consciousness of youth about the complexity posed in life in various situations. Table 3.2 shows how each step can develop a specific capacity in youth.

Table 3.2 The steps of the model and the capacities developed at each step

Steps in the model	Capacities that can be developed
Understanding a problematic situation and defining one or more problems	Learning to pinpoint and formulate one or more problems
Imagining a desirable situation	Learning to connect the problematic situation to a desirable situation; imagining change and amelioration
Imagining several options for solving a problem or problems	Learning that there are always several options and life is not limited to one or two options
After deliberating on several options, choosing the best available	Learning to make a decision about the best option

3.4.3 *How to Do It? Building a Model for Learning*

It is almost impossible to cover the literature on learning, so much is written about it. Therefore, one needs to be selective and choose the type of learning that is relevant for one's goal. I started by sensitizing concepts and then, on the basis of these concepts, constructed three experimental propositions. The next step is to develop a classroom pedagogy that facilitates a kind of person-in-context learning that I call interactionist-developmentalist learning. This concept has a clear message: through interaction, pupils learn and develop. The two concepts of interaction and development are indeed basic concepts and allow scholars to improve them in the process of their research. In line with what has been said about sensitizing concepts, these two concepts can be treated in a way that can lead to new findings. I draw on the tradition known as (symbolic) interactionism, the "sociological off-spring" of pragmatism; "interaction" is its main concept. The focus of research from the perspective of these scholars is neither individuals' "personalities" nor the "structure" of social institutions, but rather what happens between individuals (Reynolds and Herman-Kinney 2003; Reynolds 1993). The other concept, development or growth, is one of the main concepts that John Dewey used frequently, and here the focus is on the "educative development" of pupils. Dewey saw schools as laboratories of human development, as experiments in the possibilities of human development in arranged environments. Repeatedly in his writings, Dewey made clear that the goal of education could only be development (or what he called "growth"). Education means supplying the conditions that foster growth (Dewey 1916; Kuhn 1999).

The scholar who most specifically worked on learning and development was the genius Russian psychologist and pedagogue, Lev Vygotsky (1896–1934) who unfortunately died very early in his career. His concept of Zone of Proximal Development (ZPD) has become very popular and has been the subject of many studies. Let us refer to Vygotsky himself and how he connects learning, development and interaction with each other:

> Thus, the notion of a zone of proximal development enables us to propose a new formula, namely, that the only good learning is that which is in advance of development… We propose that an essential feature of learning is that it creates the zone of proximal development; that is, learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers. Once these processes are internalized, they become part of the child's independent developmental achievements. (Vygotsky 1978, pp. 89–90)

I suggest that focusing on fictive social problem-solving facilitates interaction of pupils with self and others and can be an effective tool for pupils' learning and development (Fig. 3.1).

Fig. 3.1 The suggestion that a problem-solving context facilitates creation of the triad of interacting, learning, and development
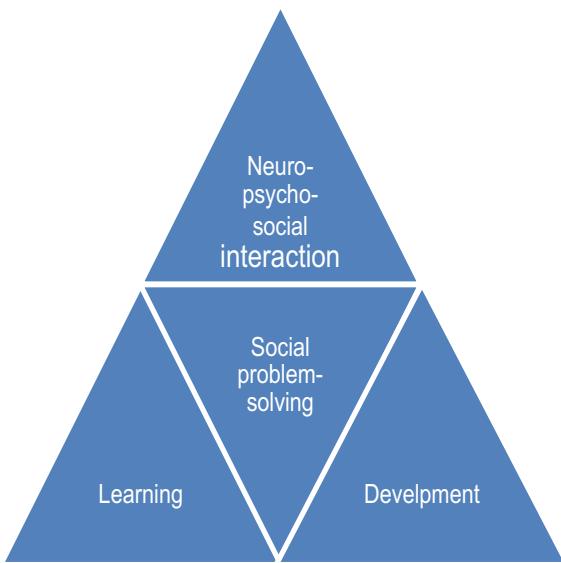
3.5   Toward a Holistic Approach to Pupils and the Classroom Context

The rest of this chapter focuses on two main points: (1) pupils as neuropsychosocial persons and (2) the classroom as a neuropsychosocial interactionist context. Starting with the first point, interactionist-developmentalist learning is a kind of learning that considers pupils as neuropsychosocial beings. Neuropsychologist LeDoux (2002) criticizes neuroscientists and psychologists because, in studying brain and human behavior, they often consider only two dimensions: cognition and emotion. He suggests the necessity of considering a third dimension, that is, motivation. Building on James (1890/1981) and Dewey (1922), we should definitely add habits as the fourth dimension. The fifth dimension that is crucial for the learning person is relationships. Learning almost always, particularly in schools, happens in a social context and in interaction with peers and teachers. Therefore, interactionist-developmentalist learning should, as much as possible, consider pupils as persons with five major capacities: cognition, emotion, motivation, habits and relationships (Fig. 3.2).

Fig. 3.2 It is important to consider these five dimensions, even if in many studies it is not possible. In this study, the dimension of motivation is not explicitly considered

3.5.1   A Three-Level (and Three-Moment) Pedagogical Context and a Mental Model

Based on many years' experience in teaching, here, I suggest a fully interactionist process in the classroom that facilitates pupils' sociocognitive development. In the intervention process, the problem-solving model is presented in the first week and the steps are illustrated through examples. In the second week, a paper describing a problem together with the problem-solving model is distributed among the pupils.

For the first 15 min, pupils are given private time to imagine the problem and write down their thoughts by following the steps of the problem-solving model. The purpose of this time is to enhance each pupil's capacity for defining a problem (step 1), imagine a desire to change the problematic situation (step 2), use their imagination to find several options for solving the problem (step 3), and develop the

capacity to choose the best alternative (step 4). This individual time allows each pupil to discover her or his own capacity to work through each step of the model. This is what I call development at the first level (the individual level), which particularly (but not merely) takes place within the first moment of the pedagogy/method.

After the individual time, the class is divided into 4–5 groups of pupils sitting together for 30 min, each pupil talking about how he or she has defined the problem and suggesting a solution. They try to reach agreement but this is not necessary; the group can come up with more than one solution. During this time, they listen to each other's ideas and find out about the pluralistic nature of understanding social problems and solving them. They learn to respect each other's' ideas. This is a crucial time for pupils to understand pluralism and try to compromise to reach agreement in group discussions. This is the second level (small-group level) or the second moment of the pedagogy/method during which pupils develop their capacity for social interaction.

Then all the groups get together and each group has a few minutes to present what they have discussed and their solution. This time is important for pupils to learn how to present an idea in front of the whole class. Finally, a common discussion takes place where the pupils, the class teacher and the researcher contribute to the discussion. This is the third moment or third level (the class level) of the pedagogy/method.

> The combination of these three levels (and moments) is an all-inclusive pedagogy for social problem solving; it encourages individual thinking and creativity, group discussion and cooperation, as well as learning the pluralistic understanding of a social problem.

A more detailed description of this three-level (or three-moment) pedagogy is presented in Chap. 5.

All five models necessary for creating the new literacy presented in this chapter are integrated in Fig. 3.3.
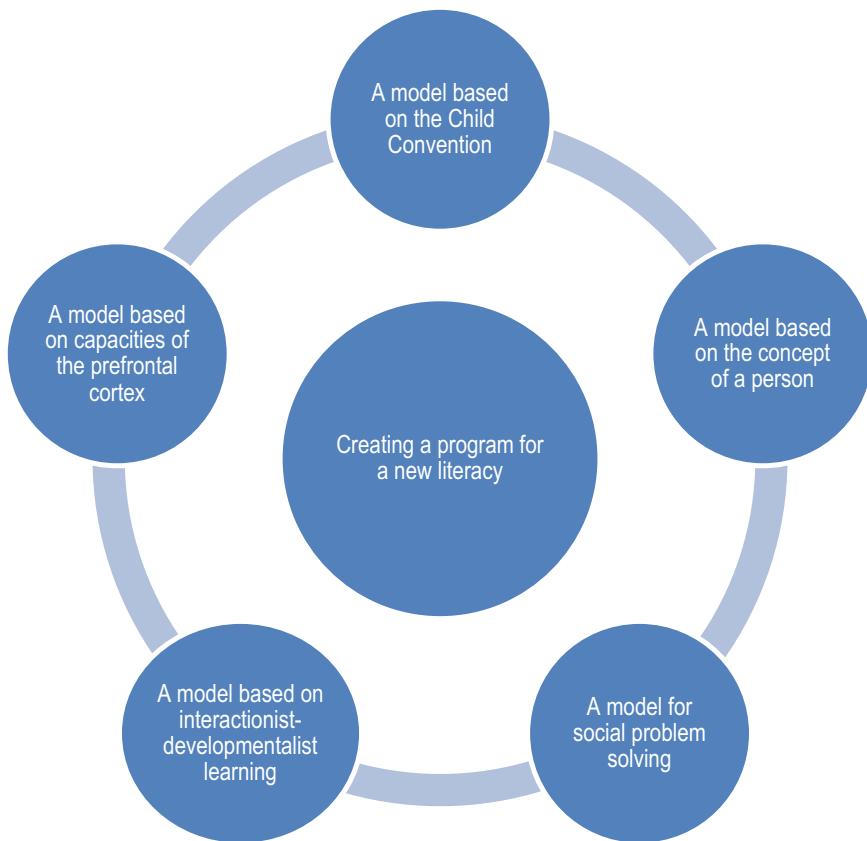
Fig. 3.3 Creation of a new literacy based on integration of the five models

References

Addelyan Rasi, H. (2013). *Empowering women in the Middle East by psychosocial interventions*. Linköping University Medical Dissertation No. 1320.

Addelyan Rasi, H., & Moula, A. (2015). Towards a conceptual framework for socio-cognitive empowerment: Lessons from intervention research with women in Iran. *Clinical Social Work*. doi:10.1007/s10615-015-0518-5

Addelyan Rasi, H., Moula, A., Puddephatt, A. J., & Timpka, T. (2012a). Empowering single mothers in Iran: Applying a problem-solving model in learning groups to develop participants' capacity to improve their lives. *British Journal of Social Work, 2012,* 1–20. doi:10.1093/bjsw/bcs009

Addelyan Rasi, H., Moula, A., Puddephatt, A. J., & Timpka, T. (2012b). Empowering newly married women in Iran: A new method of social work intervention that uses a client-directed problem solving model in both group and individual sessions. *Qualitative Social Work*. doi:10.1177/1473325012458310

American College Dictionary. (1947). New York: Random House.

Asp, E., & Tranel, D. (2013). False tagging theory: Toward a unitary function of prefrontal cortex. In D. Stuss & R. Knight (Eds.), *Principles of frontal lobes functions* (2nd ed., pp. 384–416). New York: Oxford University Press.

Blumer, H. (1970). What is wrong with social theory. In N. Denzin (Ed.), *Sociological methods* (pp. 84–95). London: Butterworth.

Bowen, G. (2006). Grounded theory and sensitizing concepts. *International Journals of Qualitative Methods, 5*(3), 12–23.

Campbell, J. (1995). *Understanding John Dewey*. Chicago: Open Court.

Coady, P., & Lehmann, N. (2008). *Theoretical perspectives for direct social work practice*. New York: Springer.

Cobb, N. (2008). Cognitive behavioral theory and treatment. In P. Coady & N. Lehmann (Eds.), *Theoretical perspectives for direct social work practice* (pp. 221–248). New York: Springer.

Damasio, A. (2010). *Self comes to mind: Constructing the conscious brain*. London: William Heinmann.

Dewey, J. (1910/1997). *How we think*. New York: Dover Publications.

Dewey, J. (1916/1944). *Democracy and education*. New York: The Free Press.

Dewey, J. (1922/2002). *Human nature and conduct*. New York: Dover Publications.

Dewey, J. (1938/1998). *Experience and education (the 60th anniversary edition).* West Lafayette: Kappa Delta PI.

D'Zurilla, T. (1986). *Problem solving therapy: A social competence approach to clinical intervention*. New York: Springer.

D'Zurilla, T., & Goldfried, M. (1971). Problem solving and behaviour modification. *Journal of Abnormal Psychology, 78*(1), 107–126.

Fuster, J. (2008). *Prefrontal cortex* (4th ed.). Amsterdam: Elsevier, Academic Press.

Fuster, J. (2013). Cognitive functions of the prefrontal cortex. In D. Stuss & R. Knight (Eds.), *Principles of frontal lobes functions* (2nd ed., pp. 11–22). New York: Oxford University Press.

Gerth, H., & Mills, W. C. (1958). *From Max Weber: Essays in sociology*. New York: Oxford University Press.

Goldberg, E. (2001). *The executive brain: Frontal lobes and the civilized mind*. New York: Oxford University Press.

James, A., & Prout, A. (2014). *Constructing and reconstructing childhood contemporary issues in the sociological study of childhood*. London: Routledge.

James, W. (1890/1981). *The principles of psychology*. Cambridge, MA: Harvard University Press.

James, W. (1899/2007). *Talks to teachers and students on some of life's ideals.* Charleston: BiblioBazaar.

Kandel, E. R. (2006). *In search of memory: The emergence of a new science of mind*. New York: W.W. Norton.

Kandel, E. R., Schwartz, J. H., Jessell, T. M., Siegelbaum, S. A., & Hudspeth, A. J. (Eds.). (2013). *Principles of neural science* (5th ed.). New York: McGraw-Hill Medical.

Kuhn, D. (1999). A developmental model of critical thinking. *Educational Researcher, 28*(2), 16–25.

LeDoux, J. (2002). *Synaptic self: How our brains become who we are*. New York: Viking.

Mead, G. H. (1934). *Mind, self, & society, from the standpoint of a social behaviorist*. Chicago: University of Chicago Press.

Mesulam, M. (2002). The human frontal lobes: Transcending the default mode through contingent encoding. In D. T. Stuss & R. T. Knight (Eds.), *Principles of frontal lobe function* (pp. 8–30). Oxford: Oxford University Press.

Moula, A. (2005). *Population based empowerment practice in immigrant communities.* Linköpings universitet, Medical dissertation 887.

Moula, A. (2009). *Empowermentorienterat socialt arbete*. Lund: Studentlitteratur.

Moula, A. (2011). An invitation to empowerment-oriented neurosociology. In B. M. Pirani (Ed.), *Learning from memory: Body, memory and technology in a globalizing world* (pp. 234–266). Newcastle upon Tyne: Cambridge Scholars Publishing.

Moula, A., & Addelyan, Rasi H. (2014). Empowering marginalized people by maximizing reflective intelligence: A pragmatist problem solving approach. *Social Sciences, 3*(6), 189–198. doi:10.11648/j.ss.20140306.12

Moula, A., Mohseni, S., Starrin, B., Scherp, H. A., & Puddephatt, A. J. (2010). The intelligent method of learning. *Culture and Development, 19*(3), 26–31.

Moula, A., Puddephatt, A., & Mohseni, S. (2014). A neuropragmatist framework for childhood education: Integrating pragmatism and neuroscience to actualize Article 29 of the UN Child Convention. In T. Solymosi & R. Shook (Eds.), *Neuroscience, neurophilosophy, and pragmatism: Brains at work with the world* (pp. 215–239), New York: Palgrave Macmillan.

Moula, A., Timpka, T., & Puddephatt, A. (2009). Adult–adolescent interaction and adolescents' brain development: Integrating pragmatism/interactionism and neuroscience to develop a platform for research on adolescents' life regulation. *Sociology Compass, 3*(1), 118–136.

New Webster Dictionary and Thesaurus of the English Language (1992). United States of America: Lexicon Publications, INC.

Oxford Thesaurus. (1992). American edition. New York: Oxford University Press.

Perlman, H. (1957). *Social casework: A problem-solving process*. Chicago: University of Chicago Press.

Pring, R. (2004). *Philosophy of educational research*. London: Continuum.

Pring, R. (2007). *John Dewey: A philosopher of education for our time?*. London: Continuum.

Reynolds, L. (1993). *Interactionism: Exposition and critique* (3rd ed.). New York: General Hall.

Reynolds, L., & Herman-Kinney, N. (2003). *Handbook of interactionism*. Lanham: Altamira Press.

Saleebey, D. (2002). *The strengths perspective in social work practice* (3rd ed.). Boston: Allyn and Bacon.

Shier, M. (2011). Problem-solving and social work. In F. J. Turner (Ed.), *Social work treatment: Interlocking theoretical perspectives* (pp. 364–373). Oxford: Oxford University Press.

Siegel, D. (1999). *The developing mind*. New York: Guilford Press.

Solymosi, T., & Shook, J. (2014). *Neuroscience, neurophilosophy, and pragmatism: Brains at work with the world*. London: Palgrave Macmillan.

Thomas, W. I., & Thomas, D. S. (1928). *The child in America: Behavior problems and programs*. New York: Knopf.

United Nations. (2001). *General comment No 1: The aim of education*. CRG/GC/2001/1.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wexler, B. (2006). *Brain and culture: Neurobiology, ideology, and social change*. London: MIT Press.

Zelazo, P., Carter, A. S., Reznick, J. S., & Frye, D. (1997). Early development of executive function: A problem-solving framework. *Review of General Psychology, 1*(2), 198–226.

Zelazo, P., & Müller, U. (2014). Executive functions in typical and atypical development. In U. Goswami (Ed.), *Childhood cognitive development* (pp. 574–603). New York: Wiley Blackwell.

Chapter 4
The Methodology

Abstract There is a vital question that many researchers face; should we choose a
single methodology and develop it so that it fits our research or, through an eclectic
approach, construct our own methodology from several existing methodologies?
No single methodology is perfect and each has its own advantages and disadvantages. Eclectic approaches have many advantages if a researcher is fairly certain that
various "borrowed" parts fit together and enrich the new construct. I draw on
several methodologies to construct what is proper for this research project, starting
from the most general and progressing to the more specific. I draw on two pragmatists methodologies to pinpoint some principles for knowledge construction.
Then, I draw on design experiments in educational research to identify and select
some of their principles. With inspiration from Blumer (*Sociological methods*.
Butterworth, London, pp. 84–95, 1970), I construct the (neuropsychosocial)
methodology of designing a series of experiments in the classroom.

Keywords Pragmatist research methodology · Designing an intervention · Design
experiment in the classroom

There is a vital question that many researchers face: should we choose a single
methodology and develop it so that it fits our research or, through an eclectic
approach, construct our own methodology from several existing methodologies?
No single methodology is perfect and each has its own advantages and disadvantages. Eclectic approaches have many advantages if a researcher is fairly certain that
various "borrowed" parts fit together and enrich the new construct. I draw on
several methodologies to construct what is proper for this research project, starting
from the most general and progressing to the more specific. I draw on two
methodologies constructed on pragmatist philosophy to pinpoint some principles
for knowledge construction. Then, I draw on design experiments in educational
research to identify and select some of their principles. With inspiration from
Blumer (1970), I construct the (neuropsychosocial) contribution of this project to
the methodology of designing the experiment in the classroom.

Maxwell (2005, 2013) emphasizes the usefulness of paradigms because they can guide the whole process of the research. Pragmatism is among his suggested paradigms in social sciences. Other methods experts refer to pragmatism as the primary source of inspiration for action research. For example, Reason and Bradbury (2006, p. xxv) wrote that "Traditionally science has privileged knowing through *thinking* over knowing through *doing*" (emphasis in original). They immediately added that some accounts of reality, for example, pragmatism, privileges experience and action over insight per se. Few would doubt the important role that pragmatists have played in laying the groundwork for the philosophy and methodology of action research. James (1907, p. 20–21), in his much quoted essay *Pragmatism*, made it clear that action is the criterion for discovering "facts":

> Pragmatism represents a perfectly familiar attitude in philosophy, the empiricist attitude, but it represents it, as it seems to me, both in a more radical and in a less objectionable form than it has ever yet assumed. A pragmatist turns his back resolutely and once for all upon a lot of inevitable habits dear to professional philosophers. He turns away from abstraction and insufficiency, from verbal solution, and bad a priori reasons, from fixed principles, closed systems, and pretended absolutes and origins. He turns towards concreteness and adequacy, towards facts, towards action, and towards power (emphasis in original).

Some researchers from such diverse disciplines as neuropsychiatry and education science have used pragmatism to create a methodology for action research. Two such efforts are summarized in Table 4.1.

Each of the four entries in the left-hand column leads us to a pragmatist research principle:

1. *Knowledge is practical.* The target group should clearly benefit from the knowledge produced.
2. *Knowledge is participatory*. We should pay attention to who participates in knowledge production and which role each plays.
3. *Knowledge is pluralistic*. The design research should allow and even facilitate the pluralistic development of knowledge production.
4. *Knowledge is provisional*. The knowledge produced can be subject to refinement.

These four principles are valid for any pragmatist research. Now we should focus more specifically on principles that are relevant for design experiment in education. Although a pedagogical design has informed the development of theories of instruction for over a century (Cobb et al. 2003), design experiments are usually linked to Brown (1992) and Collins (1992). Design experiments were developed to carry out research to test and refine educational designs based on theoretical principles derived from previous research (Collins et al. 2004). Prototypical design experiments entail both organizing particular forms of learning and studying those forms of learning within the context defined by the means of

Table 4.1 The common features of two pragmatist methodologies, which provide a platform for pragmatist research methodology

Common principles of pragmatist methodologies	Pragmatist-based methodological consideration for psychiatric research (Brendel 2006)	Pragmatist-based methodological consideration for educational research (Biesta and Burbules 2003)
Produced knowledge should be relevant for people's daily actions; practice-oriented questions should be asked for research	The aim of empirical science ought to be favorable practical outcomes for people in ordinary life	Knowledge provides us with possibilities for refining and supporting our day-to-day problem solving
The participatory roles of different actors and the influence of their perspectives in the interpersonal processes of inquiry. Who is included in the research team?	The pragmatist scientist tries to organize knowledge into a coherent system of thought, however, entertaining the possibility of a pluralistic and incompletely integrated whole	Objects of knowledge are instruments for action, and different objects, different worlds, provide us with different opportunities and possibilities for action
The pluralistic nature of the phenomena studied and the tools used. Which methods to choose and which tools to use to respect this pluralistic nature?	Research should consider how participatory clinical care can empower patients through involving them in the processes of clinical decision making	The focus is on cooperation and coordination of (action) research between researcher and practitioner
The provisional and flexible character of scientific explanation. Questions about the social constructionist nature of research	There is a growing movement in clinical medicine to reflect on the flawed nature of medical sciences and the need for provisional explanation	Rather than choosing between "objectivism" and "relativism," pragmatism focuses on intersubjectivity and how humans jointly construct their world

supporting them (Cobb et al. 2003). With reference to Cobb et al. (2003) and Collins et al. (2004), the main characteristics of the design experiment relevant for this project are presented below:

5. The purpose of a design experiment is to develop a theory about both the process of learning and the means designed to support that learning.
6. A design experiment is highly interventionist and typically is a test bed for innovation.
7. A design experiment always has two faces: it is both prospective and reflective.
8. A design experiment is iterative.
9. Theories that are developed should do real work.

The next principles are about the classroom context.

Following Blumer (1970), I use the term methodology as a guiding principle for the construction of the design.

> In Chap. 2, I explicitly discussed the beliefs on which this project is based. Here, following Blumer (1970), I construct the methodological principles that guide the research and the construction of the design experiment in the classroom. Without some methodological principles, how can a researcher intervene in the classroom?

According to Blumer (1970, p. 21), methodology in social sciences "refers to, or covers, the principles that underlie and guide the full process of studying the obdurate character of the given empirical world." This definition helps us to define the obdurate character of our empirical world, which includes pupils, classrooms, and the world.

As Fig. 4.1 shows, the classroom context is situated between the obdurate characteristics of two sets of realities. The first is about pupils as human beings with emotions, habits, relations, motivation, and cognition. Schools cannot (and should not) control and mold pupils. The second obdurate reality is how to learn from the world's existing realities—poverty, war, environmental problems, etc.—and bring them into the classroom in a proper way. The suggestion is that, considering these two obdurate realties, we can move from "legitimate powers" (authorities). Considering individuals/pupils, we can invest on the authority within pupils so that they can develop their capacities, particularly the capacity of the prefrontal cortex. We can also use the power of existing influential individuals (Milla Martin, Malaleh, etc. as we saw in Chap. 1) or organizations such as Free the Children and UNICEF. The classroom context should recognize these authorities and organize its activities accordingly. Now we can continue creation of the principles.

10. On the basis of knowledge of neuroscience, respect pupils' emotions, cognition, habits, relations, and motivation. Explicitly make the starting point activation and strengthen the pupils "authority within," that is, the capacity of the pre-frontal cortex to organize pupils' cognitive activities. This means that we invest in the capacity of human beings so this principle is based on the quality of being a human animal.

11. This principle is based on the demand of the Child Convention that schools should prepare pupils to become responsible citizens.

12. The last principle is based on the proposition that the realities of the world and the capacities of our own bodies are learned together (Gerth and Mills 1958; Lyng and Franks 2002). So we should bring these "realities" into the classroom
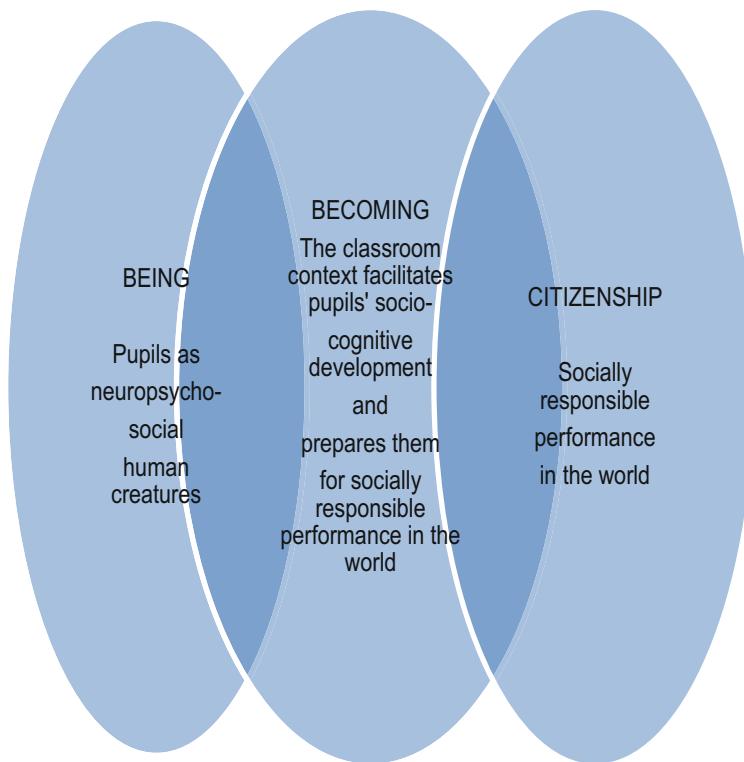
Fig. 4.1 The relationship between being, becoming, and citizenship

and allow pupils to develop their capacities to understand and become prepared to meet problematic realities such as war, poverty, and environmental challenges.

These 12 principles should guide the work in the classroom context. To conclude this chapter, it is informative to present a figure that visualizes all the components/features of the methodology. Maxwell (2013) suggested a useful methodology for qualitative research involving an interactive model between the five features of the research. Research questions are in the middle, and goals, conceptual framework, methods, and validity surround the research questions. However, there is a difference between intervention research and research based on interviews or observations. Therefore, I propose a methodology that is iterative but with the difference that designing the intervention is at the center. Figure 4.2 shows this model and its features.
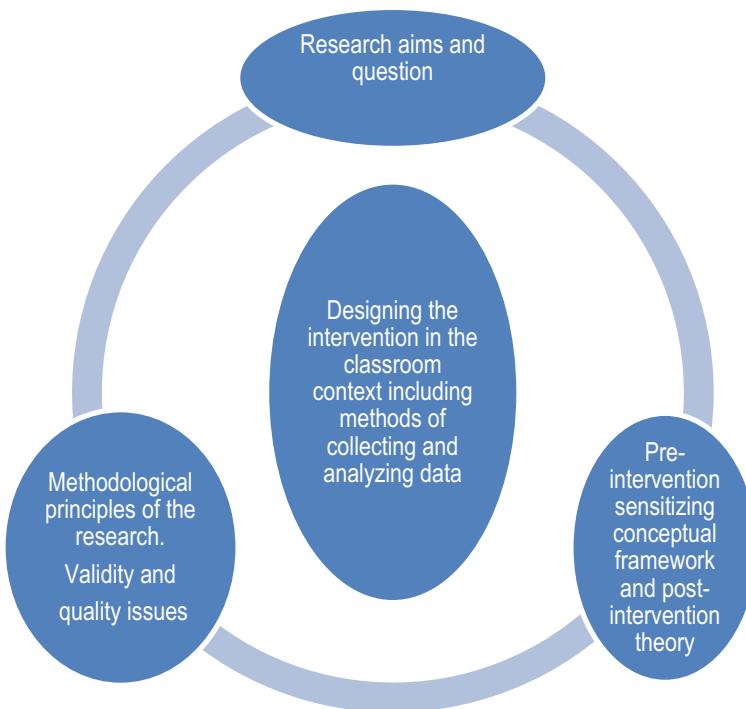
Fig. 4.2 What influences designing an intervention in the classroom

References

Biesta, J., & Burbules, N. (2003). *Pragmatism and educational research*. Lanham: Rowman & Littlefield.

Blumer, H. (1970). What is wrong with social theory. In N. Denzin (Ed.), *Sociological methods* (pp. 84–95). London: Butterworth.

Brendel, D. (2006). *Healing psychiatry: Bridging the science/humanism divide*. Cambridge, MA: MIT Press.

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions. *Journal of the Learning Sciences, 2,* 141–178.

Cobb, J., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiment in educational research. *Educational Researcher, 32*(1), 9–13.

Collins, A. (1992). Toward a design science of education. In E. Scanlon & T. O'Shea (Eds.), *New directions in educational technology*. Berlin: Springer.

Collins, A., Joseph, D., & Bielaczyc, K. (2004). Design research: Theoretical and methodological issues. *Journal of the Learning Sciences, 13,* 15–42.

Gerth, H., & Mills, W. C. (1958). *From Max Weber: Essays in sociology*. New York: Oxford University Press.

James, W. (1907). *Pragmatism*. New York: Dover Publications.

Lyng, S., & Franks, D. (2002). *Sociology and the real world*. Lanham: Rowman & Littlefield.

Maxwell, J. (2005). *Qualitative research design: An interactive approach* (2nd ed.). Los Angeles: Sage.

Maxwell, J. (2013). *Qualitative research design: An interactive approach* (3rd ed.). Los Angeles: Sage.

Reason, P., & Bradbury, H. (2006). Preface. In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. xxi–xxxii). London: Sage Publications.

Chapter 5
Intervention in the Classroom:
The Teacher's Description

Abstract This chapter describes the intervention in the classroom, which was based on a three-level (and three-moment) pedagogical context and a model for social problem-solving. The model is presented in the first week and the steps are illustrated through examples. In the following weeks, a paper describing a problem together with the problem-solving model is distributed among the pupils. For the first 15 min, pupils are given private time to imagine the problem and write down their thoughts by following the steps of the problem-solving model. The purpose of this time is to enhance each pupil's capacity to define a problem, imagine a desire to change the problematic situation, use their imagination to find several options for solving the problem, and develop the capacity to choose the best alternative. After the individual time, the class is divided into 4–5 groups of pupils sitting together for 30 min. They listen to each other's ideas and find out the pluralistic nature of understanding social problems and solving them. Then all groups get together and each group has a few minutes to present what they have discussed and their solutions. This time is important for pupils to learn how to present an idea in front of the whole class. Finally, a common discussion takes place where everyone in the class can contribute to the discussion.

Keywords Intervention in the classroom · Learning for life · A three-moment pedagogy · Learning a problem-solving model · Thinking systematically

After the first subproject at Ruds School in Karlstad was completed, the class teacher, Anders Josefsson, got financial support from my university to provide a document-based text about what we did in the classroom. What follow is his text and his words. I have translated it from Swedish. Small parts of this text are more about evaluation than description. Therefore, my first thought was to divide it and present it under these two titles, but the result was not satisfactory. Description and evaluation are so tightly intertwined that such division badly affected the text. More important, such division would involve my intervention in the teacher's text. So I decided to present it as written by Anders Josefsson. In Chap. 2 under point 11, I wrote that open research is participatory and cooperative. So let the teacher play his role by describing the intervention.

5.1   Learning for Life

During the three years from September 2009 to June 2012, Alireza Moula and I worked together in a high school class at Ruds School in Karlstad, Sweden. At the beginning of the first year (7th grade), pupils in the class learned a model for social problem solving. We devoted 55 min every week so that pupils could learn about working with this model. Once every month, these 55 min increased to 75 min. Our focus was on teaching a problem-solving model to the pupils and the model was continuously used in solving different dilemmas, which often involved ethical issues. A new dilemma was presented at each new occasion. Pupils learned a model with the following steps: (1) understanding the situation and defining the problem or problems in that situation, (2) using one's imagination and thinking and writing down a desirable situation in which the defined problem can be solved, (3) using one's creative imagination to think of possible options to solve the problem and also think of the possible consequences of each option, (4) choosing the best possible option to solve the problems. On several occasions, Alireza talked about the brain's functions and the relevance of neuroscience in problem solving.

At the beginning of every occasion, the pupils were presented with a dilemma (problem). We chose problems that were relevant for their age so that the pupils could really get involved in solving it.

Over three years (September 2009–June 2012), Alireza Moula and I worked with the same class. At the beginning, when they were in the 7th grade, they learned how to use the problem-solving model.

First, the pupils were encouraged to try to understand the situation in that dilemma and define the problem or problems in that dilemma by writing them down. The second step was about imagining a desirable situation in which the problem could be solved. The third step was about encouraging pupils to think about possible options for solving that fictive problem. They also were encouraged to think about the consequences of these options. The last step was about choosing the best option and plan for its realization.

Most pupils had the idea that it is good to be a problem solver. Solving problems includes learning and training to focus on an issue. Generally, boys had more problem focusing on one issue than girls. The pupils themselves realized this difference. Alireza talked about pupils' understanding of this difference and talked about it with reference to what we know from research on this issue. There were some discussions in the classroom about the art of concentration. As I understand, pupils increasingly understood that if they want to become successful problem solvers, they have to learn/train to focus. The texts that pupils wrote individually were collected and became a source for my (the teacher) judgment. If these texts were not collected, the pupils could not have had such good training. These collected texts were also the basis for research analysis (see Chap. 6).

As a teacher I have much to do and I have to be selective in choosing which of the pupils' texts to use for my judgments. This way of teaching had several advantages; I could see how pupils understood a situation and defined the problem

in that situation; they learn to think according to the steps of the model, using their imagination to think about the desirable situation and also think about different options to fictively solve a problem. Using this pedagogy, a teacher does not need much more examination. The individual texts, discussions in small groups and finally presentation of the results of those discussions in the class gives the teacher a good basis on which to judge each pupil's development. Pupils' capacities to argue develop and consequently the teacher's workload decreases. In order to support the pupils, during the first few months, the model and its steps were given to them along with a dilemma (problem), and they were asked to apply the model to solve that dilemma. After a few months, some of the pupils did not need this help, that is, they memorized the model and could apply it to solve the fictive problems. Most of the pupils learned to use the model. In the middle of the first semester, only a few pupils needed help to use the steps of the model to solve a problem. At the end of the first year, all pupils could use the model effectively and without help. As a teacher, it was interesting for me to see the differences/variations in how pupils learned to use the model. All pupils learned to use the model, however, the difference between the capacity of those who learned it quickly and those who needed more time and more training was unexpected for me.

Pupils are used to thinking in school and in their lives, but they are not used to thinking systematically and according to the steps of a model. It was difficult for some to think systematically. However, all learned to use the model and I think if they were awakened in the middle of the night and faced a problem, they could use the model to deal with the problem. I have met parents who told me how their children have used the model to help their siblings solve different problems. These pupils who learned to think systematically may even be good at thinking systematically when meeting other challenges in the future.

The process started with each pupil taking several minutes to use the model to fictively solve a problem. Then, they were divided into several groups (often four groups). The groups went to different rooms and often a teacher or Alireza (the researcher) was present in these groups. Each pupil read what they had written down individually. When everybody in the group had read his or her text, then the discussion started. They tried to reach agreement about which option was best for solution of the problem. Each group selected two or three pupils to present the group's discussion in the class. During group work in schools, it is quite common for some pupils to do the talking, some become quiet, some push the process forward, and some may wait for others to do the work.

We tried to positively affect this kind of "division of labor." There were two adults (teacher and researcher) so we could be present at the pupil groups and encouraged all pupils to participate in the discussion. One measure that had an important effect was that the pupils wrote down their thoughts before the group work, so everyone had something to say and those who were used to talk all the times started to listen to others. Another effective measure was that everybody in the group read aloud what he or she had written and all the others listened; the discussion started only after this process was complete. This is a very important part of the pedagogy that we used. Because the purpose is to empower all pupils, so

everyone should get the chance to think and contribute to the problem-solving process.

When the collective part of the process in small groups was completed, all pupils went to the classroom again. Two or three pupils from each group stood in front of the class and presented their group discussion and solution. Different pupils presented the group discussion on different occasions, so that all pupils got the chance to train/develop this capacity. It was interesting for pupils to listen to other groups' presentations; they were curious to find out how other groups reasoned and how they tried to meet the problem. These presentations were a natural end of the process.

At the end of the first year, the pupils' parents were invited to Karlstad University (where Alireza was working), and the university president joined the ceremony. Pupils were divided into several groups and each selected a dilemma and showed how they had learned to solve these dilemmas. At the end of the ceremony, everyone was invited for cakes and coffee. [Another event that was interesting was that] Alireza and four of pupils were interviewed by a local newspaper about the project at the school.

What pupils learned in 7th grade was indeed useful for their future. Through training in the use of a model (systematic thinking), they learned to organize their thoughts when facing a problem and how to select among several possible solutions.

The pupils learned (and developed this learning into a habit) that first they have to think; later, they can talk to each other to choose the best alternative for action. During the 8th grade, the pupils created several groups to use the model to think about the big global problems. Pupils worked on child labor, poverty, and carbon dioxide emissions. They tried to use the steps of the problem-solving model to come up with some ideas. They first defined the problematic situation, and then imagined several possible alternatives to find a good solution. The quality of their work was not as satisfactory as we wished. When we evaluated the situation, we realized that, unlike the first year when pupils worked with the model every week, now in the second year (8th grade), they worked with a new assignment every other week and, sometimes because of holidays, it was only once every three weeks. During the third year of the project (9th grade), we attempted something new and with Alireza's initiative, we started to work with executive functions. Our ambition was to support pupils to improve their study technique and consequently their study results. We concentrated on eight functions: goal setting, planning, organizing, prioritizing, memorizing, initiating, shifting, and evaluation. One hour every other week, we worked with these functions through specific examples, such as preparing oneself for examinations. We also worked with examples from daily life such as what should a teenager do if he or she falls in love. Sometimes pupils presented problems and we worked with them. On several occasions, Alireza talked about the brain's functions and executive functions in simple language.

During the second semester of 9th grade, the pupils got an assignment in geography [which is a social science subject] and they integrated what they learned from the problem-solving model with what they learned from executive functions.

Pupils worked in groups, three in each group, and each group chose a country to work with. Each group had two assignments: (a) with the help of maps describe the chosen country, (b) identify an important problem in the chosen country and, with the help of the problem-solving model, try to suggest what could be done to improve the situation in that country. The pupils' work was connected to executive functions, and we explained questions such as What does it mean to settle a goal? What is an example of a good planning? How can we take initiative? How do we choose? What does it mean to change focus (shifting)? Are there techniques better for memorizing information? What are the contents of a good evaluation?

Now you are curious to know what happened. It worked well and all groups presented their work, which was interesting for me and the whole class. Everyone thought that it was interesting to listen to how the groups used their imagination to come up with creative suggestions for solution of problems in the selected country. Because it was the pupils' own work and their own ideas, their engagement was very high when each group presented their work and when others listened. On the whole, it was clear that working with executive functions can empower pupils to work more independently.

The most important difference between this and other types of working is that here the focus is on thinking and problem solving. We did not push pupils to memorize facts. The pupils have definitely developed their capacity to think systematically. In an interview with a newspaper, the pupils emphasized that, in the beginning, it was difficult to think but they improved this capacity through training.

Now the question is: Has the project positively affected their school studies? Yes. During 9th grade, a new pupil who had some physical disability joined the class and with him the class got an extra teacher. This new teacher partly helped this new pupil and partly helped other pupils. So, it is very difficult to judge how much this new teacher (who came to this class only the last year, during 9th grade) and how much the project (over three years, 7th, 8th and 9th grades) has affected the school results of the class.

In September 2012, four classes completed 9th grade and left Ruds School to enter high school. The class we worked with got 82 very good ratings, whereas the other three classes had 63, 47, and 44 very good ratings.

As a result of this project, I (the teacher) have started to embrace parts of the pedagogy in other classes to train pupils to think and reason, which are so important for my lectures (which are about social sciences). Every pupil has a so-called reasoning notebook that I keep in the classroom. Several occasions every month, I raise a question that pupils individually reflect on and write about in their reasoning notebook. Then they build groups of four and discuss what each has written in their notebook. Finally, each group tells the class what they have discussed. Sometimes I write on the whiteboard what pupils think about an issue and we discuss it. Through this pedagogy, each pupil gets the chance to think, tell others what they have thought about, and a general discussion takes place where everyone get the chance to present her or his idea in the classroom. Pupils hear other ways of reasoning. Pupils learn from each other and can support each other. I think this is a better pedagogy than the pedagogy whereby each pupil writes down her or his text

individually and then gives it to the teacher who corrects it and gives it back to the pupil. In this new pedagogy, ideas are discussed openly in the classroom and pupils learn from each other.

Anders Josefsson, Ruds School, Karlstad, Sweden, 2013.

5.2   A Note on Ethical Considerations

As mentioned in Chap. 2, I have worked with an open research approach. The aim was to present my work with the school class in question and create a model for other classes and schools. Therefore, the anonymity question was not a relevant issue here. The headmaster of Ruds School, the pupils, and their parents were informed before the start of the project. At the end of the third year, all pupils signed a contract and gave me permission to use the data collected for my research. We never talked about the pupils' private lives. We only talked about fictive problem solving. Learning to solve fictive problems became part of their weekly social science class, not an extra hour. So, what we did in the classroom was under the control of the class teacher and school headmaster. More importantly, what we did was indeed what the Child Convention requires schools to do; it is an obligation and not a choice (see Article 29 of Child Convention). Spreading the results of this subproject cannot harm any pupil. On the contrary, pupils in this and the second subproject have proudly talked to local newspapers about what they have learned.

Chapter 6
Results Based on Multiple Evidence

Abstract This chapter presents the results of the intervention, which reached 12 conclusions. These 12 conclusions are then summarized into three broad conclusions:

1. According to the Child Convention, schools have an obligation to (a) provide the context for realization of all pupils' mental development, and (b) prepare them to perform social responsibility. This intervention research suggests that pupils should get the chance to develop both these capacities. This research has also emphasized that it is important to recognize neuroscientific insights into the role of the prefrontal cortex in developing these capacities.
2. These capacities can be developed through learning to (fictively) solve social problems. This means that pupils can learn to think systematically, that is, according to a problem-solving model.
3. Pupils can develop/use these capacities to both improve their school studies and prepare themselves for responsible adult life.

Keywords Authority without and authority within · Pupils mental development · Stop and think · Learning to solve problems according to a model

6.1 Reality-Humble Research and the Issue of a Researcher's Selections

A researcher cannot present "everything" in the form of raw data. At least three types of selection are inevitable: (1) a theoretical perspective and (2) with the help of that perspective, select what data to focus on and analyze, and (3) select what to present and what to keep for later presentations (Fig. 6.1). As social constructionists say, research results cannot be the mirror of reality (Gergen 1999). This does not mean that there is no reality out there, but you should be humble in presenting that reality. Following pragmatists, this research is a neuropsychosocial construction, not only a social construction. So, following the principles of open research
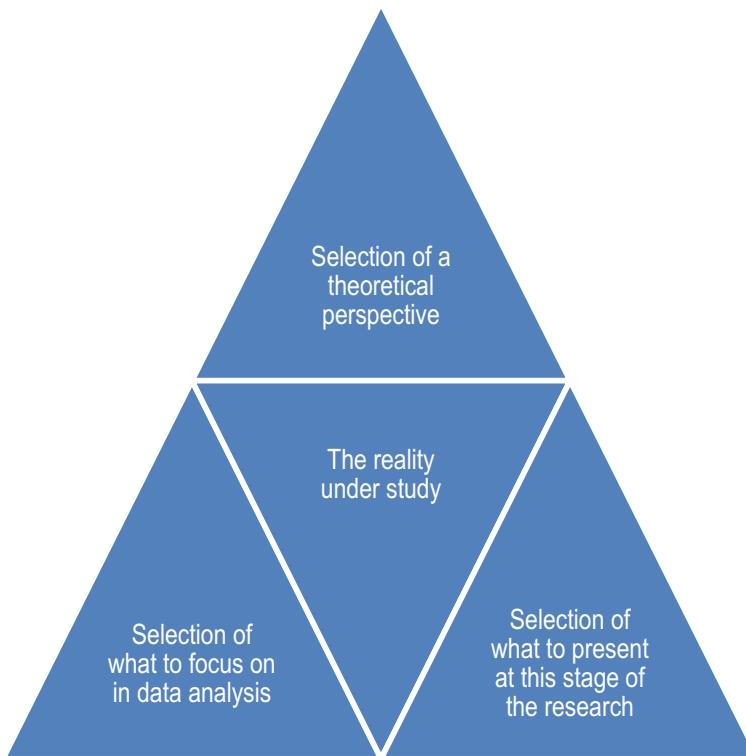
Fig. 6.1 The reality under study is limited by three influences and invites researchers to be humble and open in presenting their research

mentioned in Chap. 2, I mention my selections here briefly and let the readers to find the advantages and disadvantages. I can learn from those reflections and improve my research. This is part of what I call "Reality-Humble Research" and emphasize that a researcher cannot mirror reality but inevitably during the research process has to make choices that will affect the results. Following the aim, this research subproject attempts to create a new theory for a new literacy in schools. This theory will be used in further subprojects. Therefore, the results are not only used to understand a phenomenon but to intervene in schools. But, schools follow rules and long-held traditions, and one cannot easily go into a school and demand change. You have to rely on an authority that is accepted by schools. Since 2009, this intervention research has succeeded in creating two tightly connected sub-projects in several different schools. Without reliance on the Child Convention, I would not have got permission to intervene in these schools. So I defend my first choice, the Child Convention's directives, for two reasons: it facilitated getting the opportunity to undertake an intervention in schools, and it is an accepted document that presents things in the best interest of the child (everyone under 18 years of age).

This choice forms the first component of what I called the ameliorative triad in Chap. 2. The second component of this triad is neuroscience, which helps to interpret "mental development" as mentioned in the Child Convention. So neuroscientific insights, particularly insights from the functions of the prefrontal cortex, form the second perspective that has influenced the collection and analyses of the data. The third component of the triad is the selection of the pragmatist philosophy, which is in line with both the Child Convention and neuroscience and has particularly helped with the intervention in the classroom. In an impressive article written by five senior researchers, Cobb et al. (2003) emphasized several points, two of which are relevant here. The purpose of a design experiment (intervention in the classroom) is (1) to build a theory and (2) to choose what to analyze, because interventions in the classroom usually provide a lot of data and not all of it can be analyzed and interpreted. How exactly do we choose what to analyze? Combining these two points together guided me in choosing parts of the data that, at this stage, helped me to build a theory for further intervention. This theory is based on the ameliorative triad, that is, the Child Convention directives, insights from neuroscience, and reflections from pragmatist philosophy.

6.2 A Difference

At each session in the classroom, we (the teacher and I) presented a dilemma and the model to the pupils (see Appendix 1). The pupils read the dilemma and used the model to find solutions. We collected these papers and recorded them. These papers are the main documents for analysis. What I wish to communicate with the readers in this section is that the process, context, content, and outcome of the intervention in the classroom are closely connected, and it is not a good idea to argue which one is more important than the other. The process included learning/training to use a model for solving fictive dilemmas until the pupils mastered this. The model strongly affected the content of the learning process. One of the expected outcomes was that pupils should learn to use the model masterfully. The model and the three-level (or three-moment) pedagogy created a kind of structure/order in the context of the intervention. (For more on this see Chap. 8, Sect. 8.3.3 and Fig. 8.4)

In analyzing these documents, I realized that this type of document is very different from the traditional method of analyzing data (text) collected from interviewing. Usually the researchers read the collected text and, according to conventional content analysis, code the data, create categories, and present the data under researcher-selected themes (Kvale and Brinkmann 2009). In these subprojects, the themes already existed; they were the titles of each step of the model. Pupils wrote their thoughts *within* the model and according to the steps of the model. It took a while for me to find a proper way to deal with this issue and its difference with conventional content analysis. I also realized that I needed to follow the quantity and quality of what pupils wrote at each step.

6.3   Pretest: First Day, Before Learning
the Problem-Solving Model

On the first day of this subproject, the first thing that we (the teacher and I) did before explaining anything was to distribute a paper describing a dilemma/problem and asked the pupils to write down how they would address this dilemma/problem.

Here is the fictive dilemma (translated from Swedish):

> You are walking in the forest. You see two men hiding something among stones. You hide yourself behind a tree and wait; when they leave, you go to that place and start to look for what they had hidden. Under several stones you find a bag containing many 500 Swedish krona notes and a small plastic bag containing white powder. You guess that the plastic bag contains drugs. What do you do with the plastic bag and the money?

The pupils immediately started to write on their papers. Some of their answers are presented in Table 6.1.

Almost all pupils who were in the classroom and took the test suggested taking the bag to the police, with or without the help of their parents. Only one pupil (P5) expressed a little "deliberation" when mentioning two other possible options.

> Some of the pupils mentioned that they might take some money from the bag. This honest expression—whether reasonable/lawful or not—reveals pupils' potential for open communication, which is an important condition for learning to deliberate and becoming a socially responsible citizen.

The pupils were very quick in replying to the dilemma and after 10 min, all pupils had completed the assignment. Indeed, they thought the quicker they reply the more intelligent they are! So, we started to present the idea of "stop and think" or slow down before rushing to reply. We talked about the fact that usually there are several options in front of us, and we should consider them and choose the best

Table 6.1 Pupils' solutions before learning the model	
	I take the bag to my parents and then we will take it to the police (Pupil 2)
	I will call my parents and together, we will take the bag to the police; we may get a reward (Pupil 3)
	I take the bag with me and go to the police. It could be the result of a crime, i.e., a robbery or drug money (Pupil 1)
	I take the money and then give the drugs to the police because I want the money but not the drugs (Pupil 4)
	I may take the bag directly to the police or take first a picture and then take it to the police; it is also possible to call the police directly from that place (Pupil 5)
	I take the bag home and show it to my parents. I take a few 500 krona notes and hide them (Pupil 6)

Table 6.2 What pupils learned from the first day

(I learned) to think about all possible options
(I learned) to think before making a decision
(I learned) to think about all options before making a decision
(I learned) to think about various options
(I learned) to think about all possible options and imagine their consequences
I learned that if I was trapped in such a situation, I have to think about options before making a decision
One has to think about all possible options before one makes a decision. One has to think about the consequences before one acts
I learned to make better decisions

available option. At the end of the first session, we asked pupils to write down what they learned from the first day. Table 6.2 presents some of these replies.

EVIDENCE 1, Conclusion 1: What can be learned from the pretest?
In finding a solution to the dilemma/problem, pupils reacted immediately by appealing to the *authority without*, that is, police or parents. After the pretest, almost all pupils clearly expressed that they "learned" to think about possible options before making a decision. Already after the first day, they learned about the possibility of "stop and think" before making a decision or acting. This is an essential beginning for realizing the existence of the *authority within*, that is, the authority within their brain or the authority of their prefrontal cortex.

From the second week, we (the teacher and I) started to explain the model and empower pupils to use it to solve fictive problems.

One of my selections with regard to the data was to "jump" from the pretest to the posttest. I realized that analyzing all the collected data, that is, papers from all the weeks between the pretest and posttest, could demonstrate the learning process, but this takes a lot of time and energy and then we might ask so what? It is clear that they learn to use the model gradually until they master it. So let us find out about the results of the posttest.

6.4 Posttest and How Pupils Used the Model and What They Learned?

On December 2009, in the fourth month of the subproject and after weekly intensive use of the model to solve fictive problems, we (the teacher and I) decided to administer a posttest. The pupils sat in the classroom under examination conditions. They sat for 1 h and individually solved the dilemma according to the form they were given (see Appendix 2).

Story of the posttest

Tara is your friend. She is 13 years old and lives with her family in a house; she is your neighbor. Her mother is 43 and works as a teacher. Tara's father is 45 and works as an economist. Tara's brother is 14 and he goes to school. It is 8 pm when she comes to see you. Tara is very sad and worried. She sits beside you and tells her story and cries:

I, my mother, and my brother travelled to Copenhagen during the Christmas holidays to meet our grandparents. We wanted to stay for 8 days. My father, Lars, stayed home because he had some work to do. After 5 days, I travelled home. On my way, I called daddy but he did not answer the call.

When I came home, I saw a car parked at the house. From the yard, I saw a woman in our house. Very carefully I went inside from the backdoor and hid in the closet. I saw a woman who was half-naked and had a glass of wine in her hand. I recognized that woman; she was my father's secretary. After a few minutes, I carefully left the closet and the house. Now I am here with you and telling you what I saw (end of story).

Now, you put yourself in place of Tara's friend and neighbor. You have heard her story. Tara is very sad and cries. You hug her and she goes to sleep. You want to help her and you remember the problem-solving model you learned. You use the model and write…

In the following section, the themes used to analyze the data collected from the posttest are presented. The themes correspond to the steps of the model.

6.4.1   Step 1 Definition of the Problem: Theme 1 of the Analysis

As mentioned earlier, the analysis focused on whether the pupils learned to use the steps of the model to apply it to fictive problems and could write proper text at each step of the model. The quality of what they wrote was crucial. However, I realized that the quantity is also important. After several weeks, the pupils started to understand that, in step 1 of the model (definition of the problem) they can "see" more than one problem. These 13-year-old learners started to realize that a social "problem" can be understood as a combination of several problems. Twenty-two pupils participated in the posttest. Table 6.3 shows how many pupils found more than one problem. This method is a combination of summative content analysis and latent content analysis and is described in the following words. A summative

Table 6.3 The majority of pupils found more than one problem

One problem found	Two or more problems found
6	16

approach to qualitative content analysis goes beyond mere word counts to include latent content analysis. Latent content analysis refers to the process of interpretation of content. The focus is on discovering underlying meanings of the words or content (Hsieh and Shannon 2005). The quantity aspect of how pupils reacted to the first step of the model is presented in Table 6.3.

Now let us consider the quality of the problem or problems found. Table 6.4 shows the pupils' problem recognition and my reflections.

Now we can make some more conclusions.

EVIDENCE 2, Conclusions 2 and 3

- The majority of pupils found more than one problem. They learned that a social problem can be complex and include several problems. This is an interesting realization for 13-year-old pupils, especially considering the pretest.
- The most common problem found was that the father was not loyal to the mother. It means that norms are internalized by pupils. Another internalized norm was that the father lied to the family. So, to discover the internal authority does not mean that pupils do not respect society's norms. In other words, social

Table 6.4 Some of the pupils' thinking about the problem in the given situation

Pupils' texts	Reflecting on the pupils' reasoning
(1) Tara's father is with another woman (2) Tara saw this	Found two problems. The pupil reflects if Tara did not see this, that is, if Tara had not gone home, the first problem would not have been discovered
(1) Tara saw her father with another woman (2) Tara's father did not travel with the family; if he had travelled, he could not meet the woman (3) Maybe what Tara thinks is not true and her father is loyal to her mother	Found three problems. If the father had travelled, this would not have happened. This pupil also reflects that may be Tara's judgment is at fault
(1) Tara's father is with another woman (2) Tara travelled home earlier	Found two problems. This pupil found that the second problem was that Tara travelled home earlier than the father expected
(1) Tara saw her father with another woman (2) Tara's father has lied to the family that he has a lot of work to do and that is why he cannot travel with the family	Found two problems. This pupil wrote that the father lied because he wanted to meet the woman
(1) Tara saw her father with another woman (2) Tara's father has lied to the family (3) Tara's father is not happy with his wife	Found three problems. This pupil "thinks deeper" and assume that Tara's father is not satisfied with his wife
(1) Tara's father is not loyal to his wife (2) Tara does not know what to do	Found two problems. A very interesting finding; the problem is that Tara does not know what to do
(1) Tara's father has lied to the family that he stays home because he has a lot of work (2) Tara's father invited home another woman	Found two problems. One of them was that the father lied to the family.

values are internalized through the socialization process and they are carrying out their function. However, children and youth do not automatically realize the authority within, that is, the power of their thinking and reflections when making a decision. This should take place through education.

6.4.2   Step 2: Theme 2 of the Analysis

In this section, we look at how the pupils responded to the second step of the model, which is about imagining a desirable situation. Table 6.5 shows how many imagined one or more desirable situations.

Now, after looking at these numbers, let us find out the quality of the pupils' responses by using some illustrations in Table 6.6.

The quantity and quality of how pupils responded within step 2 of the model helped in formulating the next conclusion.

EVIDENCE 2, Conclusion 4
The pupils showed that they can use their imagination to "move" from the first step (the problematic situation) to the second step (the desirable situation), and there is

Table 6.5 Most pupils imagined more than one desirable situation

One desirable situation imagined	Two or more desirable situations imagined
7	15

Table 6.6 Some of the pupils' thoughts and my reflections

Pupils' texts	Reflecting on the pupils' responses
That woman was not there and Tara was happy	Many pupils mentioned the same desire; it is difficult to distinguish if this answer should be considered as one or two desires
The woman disappears from the situation Parents become happy and continue to be together The father will be loyal to his wife	This pupil recognizes three desires, however, they follow each other in a logical sequence
The woman was not there Tara did not travel home earlier	This pupil indicates two very different types of desire
The father was not disloyal to his wife	This pupil reflects a simple desire that is written by almost all other pupils
The father was not disloyal to his wife The father had travelled with the family	This pupil imagined two very different types of desires
The father had not lied to the family and had travelled with his family	Is this one or two desires; it is difficult to guess

coherence between what they wrote in steps 1 and 2. The interesting finding is that we can classify the desires into two categories: (1) what has happened has done damage and the desire is that it did not happen at all; (2) the desire is about what can be done now in the existing situation.

At this point let us try to find out the responses to the third step of the model, which includes imagining—or as the pupils said "finding"—several options for solving the problem or problems.

6.4.3   Step 3: Theme 3 of the Analysis

The form of the paper (that the pupils were asked to respond to) gives the option of imagining up to five alternatives (see Appendix 2). Table 6.7 shows the results of how many "solutions" were found.

Table 6.7 reveals an important point that is worth presenting as a conclusion.

EVIDENCE 2, Conclusion 5
In more than 19 years of teaching adults and youth, Iranians and Swedes, to use a problem-solving model, I have emphasized that the solutions to life's problems are not black and white—not limited to two options, one good and one bad. I have made the point that usually there are more than two options for our thoughts and actions. So, in many types of problematic situations, there are at least three options. All pupils used their creative imagination and found at least three options. Here is *the critical point when quantity is crucial for quality.* The more one uses one's creative imagination, the more options one finds, and the more options one finds the better the chance of finding a better solution.

Now, let us see what types of options they found and how they reasoned and deliberated. Two examples are chosen to illustrate the pupils' reasoning power.

One of the pupils defined the problem as Tara is sad because she saw the woman with her daddy. This pupil imagines five alternatives and thinks about the consequences of each (Table 6.8).

This pupil eventually chose alternative 4, talking to the school counselor or an adult if the school does not have any counselor. This pupil argued that a counselor is a trained adult and knows what can be done in such situations. As we see, this pupil uses the words that the mother may become "sad," "angry," "hateful," and shows clearly that he understands that this problem can create strong emotions in people. Nevertheless, he systematically goes through the model and thinks about the consequences of each alternative and chooses what he thinks would be the best for Tara. He also understands the importance of relationships and, through

Table 6.7 Number of alternatives for solving the problematic situation found by the pupils

Three or four alternatives found	Five alternatives found
12	10

Table 6.8 One pupil's thoughts about possible solutions and their consequences

Imagined solutions	Consequences
Tara tells her mother what she has seen	Parents separate from each other, or parents hate each other and quarrel with each other in the children's presence
Tara keeps quiet and does not talk about what she saw	Tara's daddy may continue to be with the woman and Tara's mother discovers this and becomes very sad and anxious
Tara waits several months and talks about it if her daddy does it again	Parents separate from each other. The situation may become worse because the mother may think that daddy's relationship with the woman has lasted a long time and her husband has not talked to her about it
Tara talks to a counselor about the situation	Parents may become angry because Tara has talked to a counselor; and her mother may become angry because Tara has not talked to her directly
Tara talks to her parents' friends	Parents do not appreciate that Tara has talked to their friends

Table 6.9 One pupil's thoughts about possible solutions and their consequences

Imagined solutions	Consequences
Tara talks to her father and asks him to leave that woman	That woman disappears and things go back to normal Maybe Tara's daddy is not happy and this can affect the whole family; Tara's father can cheat again
Tara gathers the whole family and tells them what has happened and they get help from a family therapist	The woman disappears. The mother gets angry and disappointed with her husband. They get help and maybe the pair are able to start a new relationship
Tara finds that woman and asks her not meet her father	The woman disappears, the father does not know why The mother will not find out anything May be the father remains unhappy
Tara talks to her brother. Together they choose a happy situation, for example, the whole family travels together. After that, the two teenagers talk to their father	The family gets back its unity; the father leaves the woman and lives happily with his wife

alternative five, imagines that Tara can talk to her parents' friends, however, he argues that this is not a good option and does not choose it.

Now, let us look at how another pupil has reasoned about her choices (Table 6.9).

This pupil chose alternative 2, which is about the family getting help from a family therapist: "This alternative can be the most rational option. Everybody in the family finds out what has happened and can get a chance to observe so it cannot happen again." This pupil has the idea that the father has been unhappy with the mother and that is why he is cheating. She thinks that the pair needs to get professional help so they get a real chance to improve their relationship, otherwise there is a risk that the father will cheat again. This leads to the next conclusion.

EVIDENCE 2, Conclusion 6
These two examples, as well as other pupils' responses, show that they have understood the relationships between the steps of the model. There is coherence between what they have written for the different steps of the model. They have mastered the use of the model and show this by

- Understanding each step of the model quantitatively by finding several options within each step, and
- Understanding the quality of these options, as well as the relationships between the options chosen in one step and the options in other steps.

The posttest (see Appendix 2) also included a question about what have you learned? Table 6.10 presents the pupils' responses to this question.

It is possible to classify the answers into several categories of context, content, process, and outcome, and how learning the model is at the heart of these four categories.

EVIDENCE 2, Conclusion 7

- Pupils said that in the beginning it was difficult to think; that is, they had little patience and they did not know what to write for each step of the model. But gradually pupils learned to think patiently with the help of the model and learned what to write at each step. This reveals the importance of *the process* because mastering the model is gradual. The model is at the heart of *the content* of learning in this intervention research.
- They learned to stop and think, discovering the authority within, this is one of the *outcomes* of the intervention. It is not possible to tell people to stop and think. But give them a tool to work with and usage of that tool helps them to think.
- They learned to work in small groups, discuss the problem, and become familiar with how others use the model. This shows *the relationship between the context and content*. The context included the three-moment pedagogy (see Chap. 5).
- They learned to think systematically according to the steps of the model (*outcome*).
- They can use this learning (learning the model) to solve their own problems and even help others.

The next section is devoted to new evidence.

Table 6.10 Responses of 20 of the 22 pupils on what they learned over the 4 months since the start of the intervention

Pupils' statements	Key ideas
We have learned to think through different steps of the model. It becomes easier to plan. Think more easily and better. Find the problem easier (sometimes), the first time was super difficult. Now I can do it in a different way	In the beginning it was difficult to think. Learning to think systematically after a while
We should think before acting, otherwise we can do something stupid. I learned that we can choose among different options	Learn to stop and think
How we can think when we meet a problem. How to make difficult decisions. Discuss problems. Use one's frontal lobes	To think about and discuss problems before solving them
Through meeting a fictive problem, I learned that people's situations can be bad, so if in reality a friend is caught in a problematic situation, I will help that friend as much as I can. To dare tell others about one's own ideas in a group and cooperate with others. I learned about the brain, for example, that it has two hemispheres	Helping others who have problems. To discuss ideas in groups
Usually there is more than one option for solving a problem and we should think about the consequences of what we do. A logical solution can exist, but emotions can become a barrier. Even if a more logical option exists, we may choose that which seems easier. There is a risk that we do not choose what we think is correct due to fear of what others may think. We should think through all possible options and the advantages and disadvantages of each option... We use our frontal lobes when we solve a problem. It is more difficult to solve a problem in reality than on paper	Consequential and reflective thinking
To think through different steps and stages. Do not think about everything simultaneously, because you create chaos in your brain. Think more and in a better way. I learned a little about the brain. I learned to present better in front of the whole class	To think systematically and through different steps
One should think through all possible options, even those that do not seem ideal. To think about all the alternatives, their advantages and disadvantages before selecting one. We use our frontal lobes when we solve problems	To think consequentially

(continued)

Table 6.10 (continued)

Pupils' statements	Key ideas
We have to think before acting. To cooperate better in our school group work	To stop and think. To cooperate in groups for school assignments
If emotions dominate, we may not be able to choose the best alternative. One should think through all possible alternatives. One has to think about the advantages and disadvantages of various options before selecting one. First think about what the problem is and then decide what it is that you want to improve	Consequential thinking
I learned about frontal lobes and the brain. We learned how to cooperate within groups and then to present what we have discussed to the whole class	To cooperate with other pupils in groups
I learned how to think when something happens … One can use the problem-solving model to find out how many options one has. Necessarily there is not one problem, but more than one	I learned how to think to solve a problem
One should plan for doing different things. I learned to cooperate better in our group work	I learned to plan. I learned how to cooperate in groups
I learned how to solve a difficult problem more easily. I learned how to take difficult decisions. I learned how to think better. I learned that our frontal lobes function when we solve problems	I learned to think, make decisions, and solve a problem more easily
I learned to think more and think about various options. The model is a good way for thinking. I learned to work better in a group and plan with others. I learned to think, personally, and write down what I think	I learned to think through a model. I learned to cooperate in groups
From the problem-solving model, I learned how to solve a problem that can occur in my life. I learned how to present an issue before the class	Realizing that fictive problem solving can be useful for real-life problem solving. Learning to present an issue in the class
I learned to see a problem in a new way and from various angles and think about various alternative solutions. I learned that emotions can dominate more than one might think. I learned that several problems can be the root of one [major] problem	Learning to reason and deliberate. Realizing the power of emotions

(continued)

Table 6.10 (continued)

Pupils' statements	Key ideas
I learned how to solve a problem if it occurs. I learned how to make decisions. I learned about the brain. I learned problem solving through several stages	Realizing that fictive problem solving can be useful for solving real-life problems
I learned to think through the problem-solving model. I learned to think about the possible good and bad consequences of what can occur. I learned a little about the brain	Through the problem-solving model, I learned consequential thinking
I have developed as a person. I have learned how one solves a problem in the best possible way and can help others more easily. [Now] I can more easily solve a difficult problem; I can think. We do not always need to choose one among several options; sometimes you can create an option by integrating [possibilities] from various options. You may not be able to find an ideal option. In a problematic situation, one should find the option with the least disadvantages and the most advantages. This model can help many people. Sometimes rational and emotional judgments do not fit together; one should find an option that is between these two. Both emotion and rationality are necessary in our judgments	Here is the exceptional pupil that I call Hortensia Junior. I let readers judge for themselves by carefully reading what she has written (see Chap. 9 for more about her)
I learned (1) how to find out what the problem is, (2) to think about the desirable situation, (3) to think about possible options, (4) to choose one option and plan for its realization. I learned that human beings have to make many, many decisions in their lives, whether they like it or not. I learned that the brain is the most complicated structure	I learned to think systematically through the steps of the model
Did not answer this question (pupil 21)	
Did not answer this question (pupil 22)	

6.5   Interview with Pupils

In the spring of 2010, about 6 months after the start of the project, two students in the last semester of the social work program interviewed ten of the pupils who volunteered. They first attended the class, twice, to observe and understand the aim and the process of the project. Then, on two other occasions, they conducted the interviews. All the interviews were recorded and transcribed. I used conventional content analysis (Kvale and Brinkmann 2009; Hsieh and Shannon 2005) to code, categorize, and present the data through three themes. Table 6.11 shows the categories and subcategories.

The three themes are presented in the following.

6.5.1   *The Model Helped with Slowing Down and Learning/Training to Stop and Think*

As the pretest showed clearly, before learning the model, pupils rushed to solve a problem without deliberation. Pupils recognized the difference between how they solved a problem before learning the model and after learning to use it. The crucial difference was that they needed to slow down and not rush to write down a solution. As pupil 2 expressed, using the model "prevents one from acting directly." The same pupil added that instead of "directly choosing an option [for action], one should find out what the problem is." Pupil 1 said that the aim of working with this model was that "we learn to solve problems in a more reasonable manner. This is a model with four steps, when one follows these steps, it becomes easier to choose and at the same time one does not rush to choose a solution to the problem." Pupil 8

Table 6.11   The categories and subcategories that helped organize the data from the interviews

Coding scheme	
Category	Subcategory
1 Slowing down	Not rushing to choose a solution
	Not acting directly
2 Process of learning the model and systematic thinking	Complicated and difficult in the beginning
	Later, it is easier
	Finding several problems
	Thinking about consequences
	Thinking about several solutions
	Thinking in a special way
3 Experiences from the project	Good to know self and others
	Can help others with this model
	Learned to write more
	The process that was difficult in the beginning has become easy now

indirectly refers to stop and think when emphasizing that "I learned to try to think of the consequences before I do something."

6.5.2   Systematic Thinking in the Problem-Solving Process

> To think in this special manner and think before doing something and think what is the best choice, etc. (Pupil 10)

Systematic thinking (i.e., thinking via a system, the model) is the most central category in the text of these interviews. Pupils connect thinking to: finding several problems instead of one; finding several solutions; perceiving the consequences of each alternative before choosing one; realizing that it was difficult to think in the beginning, but became easier in the process; realizing that the model helps to find out how others think, comparing their thinking with the model. They often said that, in the beginning, they did not understand the reason behind thinking through a problem-solving model. For example, pupil 4 said "I thought it [the model] was odd, what is the use of it." Pupil 7 stated:

> In the beginning it was complicated and difficult to need to think so much, because compared with the manner we think normally, we think in a different way through this model. But now, when we are in the process and have worked with the model for a long time, it is much easier to think because the model works without much effort.

Pupil number 4 indicated the need to think while going through the steps of the model. Pupil number 10 described in a more specific manner what pupils have learned by referring to the stepwise solution of a problem:

> The first thing to do is arrive at a conclusion on what the problem is. The second step is about how one can change the situation; it is about one's desirable situation. The third step is about what can one do to improve the situation. You come up with many ideas that can improve the situation. And finally, in the fourth step, one chooses the alternative with the most advantages and the least disadvantages.

6.5.3   Pupils' Experiences from Being in the Project and Using the Model

The first question in the interview was a very general question to allow the pupils to relate their own understanding of taking part in this project and learning to work with a problem-solving model: Can you tell me about the model that you have been working with? Pupil number 1 replied:

> The aim of working with this model is that we learn to solve problems in an intelligent way. It is a stepwise model with four steps that can show us how to choose an option to solve a problem and not rush directly into a solution.

Generally, pupils expressed that by learning the model, they found it easier to perceive things and write them down. Several pupils emphasized that they learned that there can be more than one problem in a situation. For example, pupil 1 said "often there is not a single problem, but several that are interconnected." This is very impressive for 13-year-old human beings to see that there is not just a single problem waiting to be solved; they have to define the problem and often there is more than one. Pupil 8, in answering the first question, emphasized that the purpose of learning the model is that we can learn to think about the outcome of something before acting, that "we do not become tempted to do something and later find out it was wrong to do such a thing." Pupil 7 emphasized that it is important to think of several options, no matter how good or bad they are. We have to think of these options and connect them with the desire we had at step two of the model. This pupil clearly expresses the point that they have understood that there must be coherence between the steps of the model. In answering the question on what is good about learning this model, pupil 3 says:

> I think it becomes easier and easier every time [that we train with the model] because I find more things. In the beginning, we could not write much, now I find too many [ideas and solutions].

Pupil 1 reflected deliberately and said that, by using this model "one can better know himself or herself." This pupil added that "you can even know how others think and consequently you can help friends through this model." Pupil 7 referred to their group work and indicated how working with this model helped pupils to know each other in a more specific way. Pupil 8 indicated that "we have learned to cooperate, because we get together in groups and work together."

The results from the interviews and various tests that we (the teacher and I) gave to the pupils are coherent and make a comprehensive whole. Here is the conclusion from the analysis of the interviews.

EVIDENCE 3, Conclusion 8
Interaction with the model empowers pupils—they can slow down, think deliberately and systematically and come up with the best available solution for a problem. This is an essential step for an adolescent to realize her or his own *authority within*. It is also necessary to create a classroom context—the *external authority*—so that pupils can develop their internal authority. It is possible to break down this general conclusion into a few more specific conclusions.

- Pupils learned that they do not need to rush to choose an option for solving a problem. They can slow down and think.
- They learned to think deliberately and systematically, define the problem, think about the desirable situation, and choose the best available option to solve a problem.
- They experienced that learning the model was difficult in the beginning but it become easier through training.

- Through working in groups, they learned how other pupils think. They also learned that they can cooperate with each other.
- The classroom context with its various moments, including thinking individually and cooperating in small groups, is a good environment for encouraging pupils to think and cooperate with each other. Using the model helped

  - each pupil to organize her or his mind
  - pupils to realize how others think
  - pupils to cooperate more easily with each other in small groups.

Theoretically, we can find many different types of thinking such as deliberative thinking or reflective thinking (Dewey 1910, 1922) or preadaptive thinking (Fuster 2013). This intervention and even the projects in Iran (see Chap. 9) helped us to come to the intervention-based concept of *systematic thinking*, which is defined as thinking that follows a system/model. This is indeed an umbrella concept that can include some other types of thinking, particularly deliberative thinking, reflective thinking, and preadaptive thinking.

> Logically it seems that you should start by teaching pupils not to rush, that is, stop and think (the first capacity, A). When they learned this, *then*, they can think systematically (capacity two, B). But you cannot just tell pupils do not rush! Stop and think! You have to engage them in an activity that facilitates systematic thinking. In the process of training systematic thinking, pupils learn not to rush and to stop and think. That is, you start with B (systematic problem solving) and during this process of learning systematic thinking, they also develop another capacity necessary for B, that is A, stop and think. In other words, while developing capacity B, they develop capacity A. In conclusion: Start with developing capacity B, capacity A develops with it!!

The next section is devoted to new evidence.

6.6   A Year After the Start of the Project

In September 2010, one year after the start of the project and after the summer vacation, when we (the teacher and I) met the pupils for the first time in the second year of the intervention, we did not give them a dilemma/problem to solve, but instead did something very different. We asked them to use the model and its steps to address a problem. No more text or oral explanation was given to the pupils.

We were curious to find out whether, after the summer vacation, (1) they remembered the steps of the model, (2) they could use it to (fictively) address a problem, and (3) what types of problems they chose. I used conventional content analysis (Kvale and Brinkmann 2009; Hsieh and Shannon 2005) to code,

Table 6.12 Choice of problem

Practical problems	Today when I came (earlier than usual) to school the gate was closed
	Pupils are not allowed to keep lots of drinks in their school boxes
	The school's chairs are not comfortable
	The heater in our class makes a bad noise all the time
	The school shop is not good
Nature and animals	Some people do not take care of their pet animals
	People throw garbage in the environment
	Many people do not take proper care of their pet animals
Social and world problems	There are a lot of conflicts in the world
	There are a lot of wars in the world
	There are a lot of wars in the world
	Homeless people who do not have any place of their own
	Some children in the world do not grow into adults because they do not have food and they die early
	There are a lot of people in the world who do not have work and therefore they cannot support their families
	Many young people do not have jobs
	There are many people in Sweden who do not have any job
	Some people have a lot of food and others are starving
	Some people do not have enough salary
	Homeless people do not get enough help/support
	In Somalia, people fight against each other
	Child labor in the world is a great problem
	There are a lot of teenagers who start smoking

categorize, and create themes to present the data. Three main themes can be recognized. Table 6.12 illustrates what kinds of problems they selected to solve.

Table 6.12 shows that of the 23 pupils who were at school that day, 5 chose practical problems, 4 chose an environmental or animal problem (one answer is not readable), and 14 chose social and world problems.

I now present three cases, one from each of these three categories to illustrate how they addressed the problems.

6.6.1 A Practical Problem

1. *Identify the problem*: When I came to school this morning, the gate was closed.
2. *The desirable situation*: The gate was not closed.
3. *Alternative solutions*:

   – I go and try the other gate
   – I wait until someone opens this gate
   – I go home.

4. *Choosing the best option and plan for its realization*: I decide to go to the other gate, because in this situation, this is the best solution.

This is a very simple problem and the pupil used the model to reach a good solution. The interesting point is that this pupil quickly used the model to solve a real problem, showing that *fictive problem solving prepares pupils to solve real problems.* The next example is from the category of Nature and animals.

6.6.2   Keeping the Environment Clean

1. *Identify the problem*: People throw a lot of garbage into the environment.
2. *The desirable situation*: I wish (a) there were more garbage bins, (b) everyone would pick up garbage, (c) there was a special day for picking up garbage.
3. *Alternative solutions*:

   – Place more garbage bins
   – Have a special day for picking up garbage
   – Everyone pick up garbage after being outdoors
   – Fine those who throw garbage.

4. *Selected option.* To place more garbage bins.

This was an example of using the model to reach a solution to keep the environment clean. The next example is from the category of social problems.

6.6.3   Social Problem Solving

1. *Identify the problem*. The problem is that homeless people do not get enough help. If they do not get help, they can become sick and can commit suicide. Or they may commit a crime to be jailed [then they have somewhere to live].
2. *The desirable situation*. Homeless people should get an apartment and a job.
3. *Alternative solutions*

   – Someone talks to homeless people and helps them
   – Homeless people apply for a job through an employment agency
   – Homeless people contact the social office and inform them of their situation
   – Homeless people commit a crime [to be sent to jail and have somewhere to live]
   – A homeless person can live with a family until he or she can find a job
   – Someone arranges a charity concert [to get help for the homeless].

4. *Selected option*. In the beginning, the person can contact the social office. If he or she does not get help, then a charity concert can be arranged.

This pupil shows sympathy for the homeless and good imagination at step three of the model.

Table 6.12 and these three illustrative cases (indeed all cases) can lead us to our next conclusion

EVIDENCE 4, Conclusion 9
Pupils have learned to use the model for very different types of problems. They automatically (without any instruction or information from the teacher and I) applied the model to practical daily life problems, problems in the environment and regarding animals, and social and world problems. The pupils showed that

- If something happens in daily life, they can use the model to address that problem.
- They had an interest in Nature and animals and were critical of people who do not respect these.
- The majority (14) showed interest in social and world problems and had the capacity to use this learning to (fictively) address these problems.

6.7 The Second Year

During the second year (September 2010–June 2011), we (the teacher and I) continued the subproject every other week. The aim was for the pupils to learn to use the model to solve a social or global problem. Four groups were formed and they selected to work with (1) child labor with the focus on Iqbal Masih, a child from Pakistan (see the Introduction), (2) immigrant youths in Sweden, (3) how Swedish pupils can help needy children in Africa, and (4) climate change. These four groups used the model to understand problems and find solutions. Unfortunately, the number of gatherings was not enough and I could not attend the school as much as in the first year. However, two groups documented their efforts in writing. Group three used the model to come up with options for Swedish pupils to collect money to help needy children in Africa. Here, are their suggestions written in a letter to UNICEF. I have translated it from Swedish:

6.7.1 A Letter to UNICEF

Hello UNICEF
    We are a class in Ruds School working on a project about poverty in Africa. We have learned a model for problem solving and now we are using it to get ideas about how we can address this poverty.
    We have thought of several options to address this problem.

1. We are thinking that if every Swedish pupil pays 4 Swedish krona every month it becomes 100 krona for each class. And this means that several thousand classes in Swedish schools can have several thousand godchildren. We also

want to establish contact with these children. In Sweden, there are limitations, and we cannot collect money from children. So, we are thinking how we can solve this problem and collect money in schools.

2. We want to meet/talk to a child in poverty in order to understand their situation. This is important because we need to create empathy with these children and their situation.

3. To make contact with some well-known high-profile people and get support for our project.

4. Our class can be divided into several groups. And then we can go and gather cans and recycle them and send the money for godchildren.

5. Bake cakes, sell them, and collect money for our cause.

6. Make a school magazine, sell it, and send the money to these godchildren.

7. With the help of international organizations who work in Africa, travel to Africa and meet African teenagers. The purpose is to create a network for African and Swedish teenagers.

8. Invite a group of African teenagers to come to Sweden and tell us about their lives.

9. The whole class engages in a variety of activities to collect money for godchildren.

10. The class arranges a flea market, sells different things, and collects money for godchildren.

I used conventional content analysis to code, categorize and present this letter (Kvale and Brinkmann 2009; Hsieh and Shannon 2005). I used the four steps of the model to create some themes. These themes will also function as a means of evaluating if the pupils have understood the steps of the model and used it in a logical way.

Step 1: *understanding the situation and defining the problem.* In point 2 in the letter, they state that they want to interview a child living in poverty to understand the situation and feel empathy for them. They have realized how important it is to both understand and feel empathy, which is essential for the helping action. In point 7, they wrote that they want to travel to Africa to find out the situation of African youths. Point 8 is about inviting African youths to come to Sweden so Swedish pupils can better understand the situation of African children.

Step 2: *the desirable situation.* It is hard to see explicitly what their desires are. They have not explained this as they did when they used the model previously. However, we can understand that their desire is about improving African children's situation.

Step 3: *imagining several options to address the problem.* They have shown great imagination and creativity in finding options to address the problem. The first point says that if it was possible to collect 4 Swedish krona *from every pupil*, it could lead to creating thousands of godchildren. Very little money for each pupil, but a great many godchildren! However, they realize that school law does not allow them to collect 4 krona from every pupil, and they assert that they want to find a solution to this problem. This point connects step three (to find a solution) to step

one (what is the problem) and reveals that they have understood that, when looking for a solution, they may meet barriers. Or, to solve the major problem, they may need to first solve minor problems. There are many interesting and varied ideas from baking cakes and selling them to collect money, to arranging a second-hand market, to creating a network of African and European youth, to creating a school newspaper and selling it in order to collect money, etc.

Step 4: *choosing the best option and planning for action.* The letter to UNICEF does not include this last step, because the pupils understood that they were writing a letter to UNICEF with as many ideas/options as possible and the aim was not to choose the best. The overall evaluation is that these pupils showed great imagination and creativity, especially in steps 1 and 3 of the model; that is, in understanding the problematic situation and suggesting options to address the problem. They revealed that they had the capacity to use the model to help people in other countries.

6.7.2   Climate Change

Another group discussed the problem of climate change and came up with some suggestions for a solution. One of the pupils (called Hortensia Junior, see Chap. 9) left this class and Ruds School in the middle of the year, however, she personally agreed to report what they discussed. She used the problem-solving model to write the report. She wrote the text in English (she mastered both Swedish and English). Below, I first present a summary of her introduction of the rather long text.

> The situation of the world is going downhill [deteriorating]. Environmental degradation, war, poverty, violence and injustice are constant problems on our planet, where everything revolves around power and money. Sometimes the love seems to be forgotten – the love for each other, and [for] our planet. The leaders of the world aren't doing much to stop this – [they are] afraid of losing their power… There are organizations and political parties all over the world who fight and work for a greener and better planet, but unfortunately, problems can't be solved permanently without [preventive] change. You have to *prevent* it. Every year, big ships let off tons of chemicals in the seas, garbage weighing millions of tons are – literally – buried under the ground in San Francisco, the rainforest, one of our primary sources of oxygen, is cut down in favor of tobacco growing and furniture production.

Hortensia Junior used the model to illustrate how we can meet environmental challenges through systematic thinking. We can see that her text is in line with an analysis in which each step of the model is a category or theme; four steps as four category or themes. I present a short reflection at the end, but her text as follows has not been changed.

1. **Identify the problem**

It is important to remember that the problem is not always just one issue—usually there are many problems, but they go hand in hand. This can be called a chain problem.

- The environment is threatened, and every day the situation gets worse.
- Great amounts of carbon dioxide are released. A person living in the USA emits 20 tons of CO_2 every year, but a person in Kenya emits less than 0.5 tons. This causes an increase in global temperature, which leads the ice to melt. The water level rises, and islands and coasts are flooded.
- The rainforests are cut down. This is not only one of our main sources of oxygen; it is also home to many species of animals. Some of them are threatened by extinction, among them the gorillas, one of the closest relatives to humans. This is yet another sign of how careless and selfish people can be.
- Overconsumption. In the wealthier parts of the world, the industrialized countries, we have more than we actually need. In Sweden, we shop a lot, especially in comparison with developing countries. We think about what clothes to wear, and regularly buy lots of makeup, several pairs of shoes, and cell phones. In the countries where poverty is part of everyday life, people starve and die. To consume more than necessary has its impact on the environment. Our resources are limited—but not everybody sees this.
- People don't think [deliberately]. We live in today—do what we want to do, not thinking about the consequences of our actions, ignoring the impact our actions have on the environment, and overuse our limited resources, while people in the world are dying.

2. **Desire**

This is the step where you figure out what you want—the wanted [desirable] situation. Here, there are as many wishes as there are problems in the world, but these are the main ones:

- That our planet is treated with respect and love, and that our nature and human rights always precede [are regarded more important than] money.
- That people think [deliberately]. Analyze, think about consequences and make the right choices.
- That [deliberative] problem solving is something worldwide, something everyone can learn and everyone knows.
- A future where people live in harmony with nature.

3. **Solutions: alternatives**

At this step, you think about ways to reach your goal. Things that you can do to solve the problem/problems. It is important to consider everything: consequences, advantages and disadvantages, and to write down everything you can come up with. No alternatives are bad—afterwards you can choose the one you want, that is right for you and your conditions. Something this big need changes both at the individual

level and at higher levels, politically, by the countries' leaders. Some changes might be impossible for an "ordinary" person to achieve, but we have to do everything we can. And everyone can do something. [Below she suggests some concrete actions]

- Demonstrate. Be seen, try to make people wake up by collecting your friends and show the facts.
- Start an organization, or be part of an already established organization. In this way, many people work together to make a change.
- The politicians should do everything they can. The priorities are environment and human rights, and by making diverse laws and starting projects among the people, they can help the people to do what they want.
- Save energy by taking shorter showers, turn off the lights in your house when they're not needed, and when possible choose "green" electricity.
- Limit your CO_2 release by taking your bike or use public transport instead of your car. If you have a car, use green fuels.
- Don't buy more things than you need. Remember that everything you buy comes from somewhere … [Think about] the energy it takes to produce the item and the impact it has on the environment. Consider everything, and when you can, make sure you buy clothes and food that are certificated with symbols such as eco or fair trade.
- Make your opinion heard—write to magazines, organizations, or politicians.
- Make changes at your school—start groups, projects, talk to the leaders and managers.
- Teach the model to everyone you know—and make them spread it.

4. **Choose alternative(s)**

When it comes to choosing, you certainly don't have to choose only one of the options—you can select as many as possible, and group them together. (End of Hortensia Junior's text)

As mentioned above, Hortensia Junior was in that class at Ruds School during the time the group were discussing environmental challenges. But she then left that school and this text was solely written by her. She has shown great capacity, indeed exceptional, to use the model to meet this problem. I have written about her in some detail in Chap. 9.

EVIDENCE 5, Conclusion 10
These pupils showed that they can use the model to meet global problems and they can be very creative in this. Indeed, learning and using the model can become a habit of mind. Pupils can meet problems by thinking systematically, whether it is a simple daily life problem, a social problem, or a global problem.

6.8 Third Year: Integrating Executive Functions of the Brain with Educational Goals

Here I briefly describe what we did in the third year (for a more detailed description, see Chap. 5). Our aim was to work toward Swedish school law (in Swedish called Lpo 94), which is about how each pupil should get the opportunity to

- develop her/his capacity to formulate and work with problems that can be local, global, environmental, or survival issues.
- develop her/his capacity to conclude and generalize as well as explain and argue for her/his thinking and conclusions.

Pupils formed into groups of three, chose a country, and tried to describe a problem in that country and use the problem-solving model to suggest solutions. They did the work together but each pupil wrote her or his own report. The work was based on strengthening pupils' executive functions through application of the model to do an assignment in geography. However, executive functions have a much broader use than in just geography or other traditional subjects. Several scholars illustrate the importance of executive functions in school and beyond:

> As the demands of our school curricula increase, students are expected to use executive processes for more and more assignments in order to prepare for high school, college, and beyond. The primary goal for teachers has been to prepare students by teaching them the content and skills valued by our highly literate society, such as reading, writing, spelling, math, history, and science. While the end product of learning is important, it is evident that students do not retain all the content they are taught from year to year. Therefore, it is even more important to teach students the executive function processes that *will* carry them over from elementary school to middle school, high school, college, and even into the real world. (Meltzer et al. 2007, pp. 186–187, emphasis in original)

We (the teacher and I) believed that using the model facilitates strengthening of pupils' executive functions. Table 6.13 compares problem-solving and executive functions.

Table 6.13 The essence of the problem-solving model and executive functions

The problem-solving model applied to an assignment in geography	Executive functions
Find an existing problem in that country and describe it clearly	Formulate a goal
How the situation could be if it was unproblematic; describe the desirable situation	Plan Organize
Write down several suggestions for improving the situation. These suggestions should improve that country's situation	Initiate
Imagine the consequences of each suggested alternative	Choose
Choose one or more of the alternatives that you think is best and argue why you think it/they are best	Change focus Remember Evaluate

As we see, working with the model gives a good opportunity to develop the capacities mentioned in Swedish school law (Lpo 94) as well as expand executive functions. The assignment given to pupils is presented below.

The working scheme—the assignment for pupils
You will work in groups to present a country for your class. Your presentation will include a geographical description of that country and a problem that exists in that country. You will work with that problem through the problem-solving model that you have learned.

Pupils worked in groups but wrote their assignments individually (see Chap. 5) on the teacher's description and evaluation of the third year).

EVIDENCE 6, Conclusion 11
During the third year, the pupils used the model to do a school assignment. Again, we combined individual and group work. They worked in groups but wrote their text individually. The teacher was quite satisfied with the result of this trial. At the end of the third year, the grades of the pupils from this class were much higher than the grades for the other three classes who did not participated in the intervention project. An interesting question raises here; is this due to the three years' work with these pupils? (See more on this at Chap. 5) Anyhow, further research is required to reach a more valid result.

In the next section, new evidence is presented.

6.9   Testing Adults

In 2010, the second year of this subproject, I had the idea of testing some adults. Experiences from years of teaching social problem solving to adults taught me that even adults do not use *systematic thinking* in addressing problems. But I had never put this to the test. So, I chose a class of social work students from Karlstad University who were in the second semester of their first year (with permission from the head of the department). I had not taught them social problem solving. The test was completely voluntary and anonymous and I was not in the classroom when each student decided whether to take the test or not. Of the 41 students who were at the university that day, 32 took the test. They were between 20 and 46 years of age. I gave them the same dilemma/problem that was given to pupils on the posttest (see Sect. 6.4).

I used summative content analysis and latent content analysis (Hsieh and Shannon 2005), as explained previously in Sect. 6.4.1, to analyze the collected papers. These students were not given a model, so it was up to them to fictively solve the problem with or without the mediation of a problem-solving model. The results are presented in Evidence 7, Conclusion 12.

EVIDENCE 7, Conclusion 12
It is possible to assume that these 32 adults (aged between 20 and 46 years) reacted immediately and without the mediation of any model or system. Their replies can be divided into three categories:

- Some replied without any deliberation
- Others replied after a little deliberation
- No student replied after "systematic thinking," that is, according to a system or model as we can see explicitly.

Analysis of the result suggests that the majority decided to act (fictively) according to a norm such as, it is not Tara's fault or worry, it is her parents' problem. Or the mother has the right to know what has happened. So, it is very interesting to discover the answers to these questions: Do adults who meet a problem react immediately, that is, without the mediation of systematic thinking (using a conceptual system/model)? Can adults address problems systematically only on the basis of experience—that is, without an education that teaches them to use a model for solving problems? Have adults discovered the authority within, that is, the power of systematic thinking before reacting in a situation? These are very interesting questions that can lead us to very important conclusions. I hope in the near future, I can organize such tests with a large group of adults.

6.10   Summary of All Results

A summary of all results, questions, and suggestions for further study are presented in Table 6.14.

Before ending this chapter, I summarize the 12 conclusions into three broad and basic statements:

1. According to the Child Convention, schools have an obligation to provide the context for realization of (a) all pupils' mental development, and (b) prepare them to perform social responsibility. This intervention research suggests that pupils should get the chance to develop both these capacities. This research has also emphasized that it is important to recognize neuroscientific insights into the role of the prefrontal cortex in developing these capacities.
2. These capacities can be developed through learning to (fictively) solve social problems. This means that pupils can learn to think systematically, that is, according to a problem-solving model.
3. Pupils can use these capacities to both improve their school studies and become prepared for responsible adult life.

Table 6.14 All results of the three-year intervention: what can we learn?

Data	The essence of the conclusions	Questions and suggestions
Pretest		
Evidence 1	Pupils rushed to solve the problem by appealing to the *authority without*	Can pupils learn to trust the *authority within* and use this capacity to stop and think deliberately? Do adults behave differently? This question led me to test a group of adults
The weeks between pretest and posttest Collected data but did not analyze them	Continuous use of the model helped pupils to stop and think. They are learning to discover the *authority within* and developing their capacity to think, reason, and deliberate	I have not analyzed all the data from all weeks. Have I missed much information? Is it important to compare pupils with each other and understand how quick or slow they learn? I may not be able to do such a comparison, because these subprojects are open and such a comparison and ranking of students may not be ethical
Posttest		
Evidence 2	All pupils have learned to use the model for fictive social problem solving, however differently. But we never ranked pupils systematically	Can they use this learning for other tasks? This question led us (the teacher and I) to plan the second year differently
Interviews with pupils		
Evidence 3	Interviews acknowledged much of the results from the tests, but also added to those results. For example, the crucial conclusion that you should start teaching pupils systematic thinking (B) and during this activity, they learn to stop and think (A) (see Conclusion 8)	There is a need for more interviews
The test after one year		
Evidence 4	The pupils showed that they could use the model to solve very different types of problems; daily practical problems, environmental problems, or social and global problems	There is a need to more precisely categorize different types of problems and define what is a social problem

Table 6.14 (continued)

Data	The essence of the conclusions	Questions and suggestions
The results of the second year		
Evidence 5	Pupils formed four groups. We got the results of two groups. Once every 2 or 3 weeks was not enough to encourage more results. However, the available results suggest that pupils could use the model to meet great challenges such as poverty in the world and climate problems	There is a need to repeat what we did in the second year and this time attend the class more systematically than I did
The results from the third year		
Evidence 6	There is a great similarity between the essence of problem solving and what is called executive functions. Problem solving can enhance executive functions of the brain, that is, functions of prefrontal cortex	There is a need for more theoretical study of the similarities between problem solving and executive functions. Can we claim that our three-year intervention was the major influence behind the much better results of this class than the other three classes in that school?
The results from the adults' test		
Evidence 7	Adults showed no remarkable differences from the pupils	There is a need for further tests with adults and for theoretical explanation. Comparison between intervention projects in Iran with this intervention project in Sweden can raise important questions (see Chap. 9)

References

Cobb, J., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiment in educational research. *Educational Researcher, 32*(1), 9–13.

Dewey, J. (1910/1997). *How we think*. New York: Dover Publications.

Dewey, J. (1922/2002). *Human nature and conduct*. New York: Dover Publications.

Fuster, J. (2013). *The neuroscience of freedom and creativity: Our predictive brain*. Cambridge: Cambridge University Press.

Gergen, K. (1999). *An invitation to social construction*. London: Sage Publications.

Hsieh, H. F., & Shannon, S. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288.

Kvale, S., & Brinkmann, S. (2009). *Den kvalitativa forskningsintervjun*. Lund: Studentlitteratur.

Meltzer, L., Pollica, L., & Baezillia, M. (2007). Executive function in the classroom. In L. Meltzer (Eds.), *Executive function in education: From theory to practice* (pp. 165–193). New York: Guilford Press.

Chapter 7
Reflective Integration of Conclusions for Theory Building

Abstract This chapter reflects on the results with a theoretical "dress" and constructs six accounts that will be used to construct the new theory:

1. The first account is to operationalize Article 29 of the Child Convention regarding every child's right to achieve her or his optimal mental development and schools' obligation to prepare pupils to have social responsibility.
2. Neuroscience can help us to be more specific about mental development. The capacity of the prefrontal cortex to organize thoughts, feelings, and action can be operationalized through the systematic use of the problem-solving model.
3. Pragmatist educational philosophy gives us some specific principles for creating a classroom context.
4. Interactionist-developmentalist learning within the context of the three-level pedagogy develops each individual's capacity for mental development as well as each pupil's capacity to cooperate in groups. Individual development and social development have a proper chance to develop harmoniously.
5. Social problem solving is the content of the interactionist-developmentalist learning. It is both the aim and the method (pedagogy) of that learning. Learning and mastering the use of a problem-solving model is vital in this process.
6. By presenting many different kinds of problems, we engage pupils in understanding local as well as global problems and encourage discussions about possible solutions. This can prepare pupils for ameliorative preadaptation to the world.

Keywords Capacity building · Learning at a deeper level · Multilevel action in the classroom

Chapter 6 provided 12 conclusions that were summarized into three broad statements. This chapter aims to reflect on these conclusions and statements, integrate them, and carry them to the next chapter, which is about theory building. Therefore, such integration needs a theoretical "dress" so that we can move from the practice level to an abstract level, from details to a higher level of propositions. These 12 conclusions and the three statements can be placed in a tripartite structure:

(a) individual level, (b) class level (interaction in the classroom), and (c) level of societal (social) problems. There is a need for theoretical propositions to help us move between these three levels as well as move between empirical and theoretical levels. I will proceed in the following order:

1. The intervention will take a step toward theorizing by getting help from Lyng and Franks (2002) action model.
2. With the help of Dewey (1938/1998), the intervention will be interpreted according to a method or pedagogy.
3. Learning in the classroom will be interpreted with the help of Bateson's taxonomy of learning.
4. Knowledge building will be compared with capacity building.
5. Some accounts will be generated for theory building.

7.1 Toward a Proposition for Multilevel Action in the Classroom

Lyng and Franks (2002) action (indeed transaction) model negates the dualism between words and deeds and creates a model of action that starts from thinking at the individual level and ends with praxis at the societal level. This model covers well what we did in the classroom and gives the intervention a more theoretical "dress." According to this model, at the lowest level of action, we think of something. By putting our thoughts on paper, we move to the second level. Writing helps us to explain our thoughts to ourselves and to others. Talking to others is the third level of action and is about interacting with others, exchanging ideas, and cooperating. At the fourth level—deeds—thoughts and words are put to work; we make them happen and they have practical consequences. Finally, at the "praxis" level, we are encouraged to put our knowledge into practice to satisfy human goals at the societal level (e.g., see Moula 2005). How can this multilevel action model raise the results to a higher level of abstraction? This helps to interpret the intervention in terms of a preparatory multilevel act or what I call neuropsychosocial preparatory act in the classroom. Here, I refer to the three-level pedagogy (three-level method) and the problem-solving model, which were used continuously, starting from (1) pupils (and teachers) recognition of the capacity within pupils' brains and investing in this capacity, which can lead to learning to think systematically; (2) pupils learn to develop this capacity by putting their thoughts on paper; (3) pupils learn to carry their written thoughts to group discussions; (4) pupils learn to stand in front of the class and present their small-group discussions; (5) during the second year, pupils learn to use their systematic thinking and problem-solving ability to suggest how we can help children in other countries and meet environmental challenges; (6) pupils learn to use these abilities to improve their school results. What is needed now is pedagogy (method) to realize these capacities.

7.2   Toward Creating a Method (or Pedagogy) for Successful Multilevel Action in the Classroom

Let us take things a step further and focus on the method (pedagogy) we used in the classroom. However, this should not drown us in details so that the big picture is lost. Therefore, once more, we refer to John Dewey who guides us to focus on method within the tripartite construct, that is, the individual level, the class level (interaction between pupils and between pupils and teacher), and the societal level. Here is a long but helpful statement.

> We are told almost daily and from many sources that it is impossible for human beings to direct their common life intelligently. We are told, on one hand, that complexity of human relations, domestic and international, and on the other hand, the fact that human beings are so largely creatures of emotion and habit make impossible large-scale planning and direction by intelligence. This view would be more credible if any systematic effort, beginning in early education and carried on through the continuous study and learning of the young, had been undertaken with a view to making the method of intelligence, exemplified in science, supreme in education. There is nothing in the inherent nature of habit that prevents intelligent method from becoming itself habitual; and there is nothing in the nature of emotion to prevent the development of intense emotional allegiance to the method (Dewey 1938/1998, pp. 100–101).

This cherished quotation includes the tripartite construct and much of what is significant in this subproject. Dewey's aim is "large-scale planning and direction by intelligence." Dewey is clear that, to reach this aim, we have to purposely educate children, and at the heart of this education, we should place "the method of intelligence." Discussing this quotation, there are several points we have to consider when Dewey used the term "method."

1. According to Dewey, there has not been any effort to make this method a common activity in schools.
2. The method can get inspiration from science.
3. The method can become habitual.
4. The method is companionable with emotion.
5. There is a tight relationship between the method, learning, and pupils' mental development.

Now, let us look at these points by simultaneously referring to intervention from this subproject and supporting theoretical/conceptual sources. Point 1 is acknowledged by the United Nations almost 60 years after Dewey's statement (see Chap. 1). And the aim of this research subproject is in line with Dewey's idea. Point 2 indicates that it is possible to teach the essence of scientific thought to pupils. Indeed, the model that was taught to the pupils in this subproject encompasses what Dewey had in mind. In her book, *Learning to Think: Disciplinary Perspectives*, Janet Gail Donald (2002) has empirically studied how people at universities think within different disciplines. Problem solving is the most comprehensive method that can be used in various disciplines. Table 7.1 shows the similarities between social problem solving and scientific problem solving (Donald 2002).

Table 7.1 The similarities between social and scientific problem solving

Social problem solving	Scientific problem solving	Common concepts
1. Understanding the situation and defining one or more problems 2. Imagining a desirable situation 3. Imagining several options for problem solving 4. Selecting the best possible option and plan to actualize that	1. Description of a situation, and organizing (selection of) information around it 2. Representation; portrayal through symbolic means 3. Inference; act or process of drawing conclusion from premises or evidence 4. Synthesis; composition of parts or elements into a complex whole	1. Understanding, selection, and description 2. Using imagination to represent 3. Referring to existing "reality" to make change or prove something 4. Making a decision on creating/presenting a new construct

Just like scientific problem solving, a social problem-solving model can also be considered as a conceptual system in that a key concept characterizes each step of the model. "To have learnt a concept is to see it in relation to other concepts and to be able to apply it correctly. It is to have acquired that logical interrelation of concepts through which experience is organized in a particular way" (Pring 2004, p. 22). What are the concepts that these two models share? In both models, the first step is about understanding a situation or a phenomenon and describing it. One has to make some selections; you cannot describe everything. The second step is to use imagination to think of the problematic situation or the phenomenon in a different way. You move from the concrete in front of you to find a more satisfying solution. In the third step, you are back to "reality" to present your new idea. In the fourth step, you decide to meet the challenge by your new construct. And as the quotation from Pring suggests, the important point in each model is the way each step relates to the other steps, the logical connection between these steps. Both models fit well with what Dewey (1910) called reflective thinking, a process that starts from understanding a problematic situation and ends with ideas for changing or ameliorating the problem.

Now, let us go back to the five points that was made from Dewey's long quotation. Point 3 brings up Dewey's idea that pupils can learn and make this learning a habit. This study has emphasized that, *after learning the model, pupils should use it continuously so that it becomes a habit of mind.* And they used it over three years. Point 4 encompasses Dewey's idea that emotions do not prevent learning of "intelligent method." The distinguished neuroscientist Antonio Damasio stated this clearly:

> We even can modulate our emotional response. In effect, one of the key purposes of our educational development is to interpose a nonautomatic evaluative step between causative objects and emotional response. (Damasio 2003, p. 54)

It is clear that what pupils learn through the steps of the model is reasoning. Philosophers Lakoff and Johnson (1999) in their classic book *Philosophy of the flesh* wrote

Reason has been taken for over two millennia as the defining characteristic of human beings. Reason includes not only our capacity for logical inference, but also our ability to conduct inquiry, to solve problems, to evaluate, to criticize, to deliberate about how we should act, and to reach an understanding of ourselves, other people, and the world. (Lakoff and Johnson 1999, p. 4).

These two thinkers also added that reason is embodied. This is what I have been indicating with reference to the prefrontal cortex as the part of the brain that is crucial for reasoning. In line with Dewey and Damasio, they also emphasized that reason "is not dispassionate, but emotionally engaged" (Lakoff and Johnson 1999, p. 4). Damasio (2003, p. 148) explains the relation between reasoning and emotion; "The emotional signal is not a substitute for proper reasoning. It has an auxiliary role, increasing the efficiency of the reasoning process and making it speedier." This expert on emotion and consciousness added that "more importantly, the emotional signal can operate entirely under the radar of consciousness. It can produce alteration in working memory, attention and reasoning so that the decision-making process is biased toward selecting the action most likely to lead to the best possible outcome" (Damasio 2003, p. 148).

At this point it is important to highlight an issue. In this book, the role of cognition is emphasized, however, this does not mean that emotions are not significant in our daily lives or in problem-solving situations. Human beings are already and to a great extent under the influence of their emotions and habits. Therefore, we should plan to create suitable spaces so that people can learn/train to think more systematically and reflectively. This issue is recognized by many philosophers (e.g., see James 1890; Dewey 1922; Mullen 1995).

Now it is time to devote some space to point 5, learning, which is so crucial for this intervention research.

7.3   Learning at a Deeper Level

In Chap. 3, interactionist-developmentalist learning was presented. The main idea is that focusing on problem solving in the classroom with the three-level pedagogy facilitates learning and mental development of pupils. Learning and different levels of it have been studied by many thinkers; one such known model is Bateson's taxonomy. Table 7.2 compares Bateson's taxonomy with interactionist-developmentalist learning.

Usually in schools the emphasis on learning is memorizing knowledge, what Freire (1996) called the banking concept of education. McWhinney and Markos (2003, p. 19), although not negating acquiring new knowledge, draw on Bateson's

Table 7.2 Comparison of Bateson's taxonomy with interactionist-developmentalist learning

	Level 1	Level 2	Level 3
Bateson (1972)	Rote learning, acquisition of knowledge	Reflecting on one's own life	Reflecting on human life and world order
Interactionist-developmentalist learning (this study)	Learning the steps of the model and learning that it is possible to stop and think; discovering the authority within (Conclusions 1–8, see Chap. 6)	Reflecting on one's own previous thinking and the new way of thinking; comparing one's own thinking with others (Conclusions 7 and 8, see Chap. 6)	Preparing to use this capacity to practice social responsibility and ameliorate the world (all conclusions but especially Conclusions 9–11, see Chap. 6)

taxonomy and conclude that "learning is the acquisition of knowledge as well as of modes of organizing, questioning, making decisions, and exploring our own assumptions and constructions of reality." In this project, the emphasis has been on the fact that besides traditional knowledge, including literacy and numeracy, there is a need for a new kind of literacy that I call social problem-solving literacy. Such literacy not only teaches social problem solving, which is crucial for social life, but can also improve systematic thinking and reasoning in traditional subjects.

7.4   Knowledge of Capacity Building

In their work, Scardamalia and Bereiter (2006) discussed knowledge-building communities, and their emphasis is on knowledge building as a cooperative rather than an individual activity. They presented their ideas in six points. I take this as a starting point to develop some ideas for this subproject. What is considered here is the knowledge of how pupils can develop their capacity for responsible social problem solving and knowledge of the three-level (or three-moment) pedagogy that we (the teacher and I) used, which emphasized the individual thinking of each pupil and their group work. Table 7.3 compares these two perspectives on knowledge.

7.5   Integrating Conclusions for Theory Building

Theory, inquiry and empirical facts are interwoven in a texture of operation with theory guiding inquiry, inquiry seeking and isolating facts, and facts affecting theory. (Blumer 1970, p. 85)

Table 7.3 Two different types of knowledge; comparison of knowledge building with capacity building

Knowledge building	Knowledge of capacity development
Creative knowledge work can be defined as work that advances the state of knowledge within some community of practice	Knowledge of mental capacity development creates consciousness of the authority within; according to the Child Convention, this should happen in all schools in the world
Idea improvement: there is no final state of perfection; advances in knowledge always raise new questions	The knowledge created by this first subproject will be developed further in other subprojects and hopefully by other scholars too
Knowledge of instead of knowledge about; whereas knowledge about is approximately equivalent to declarative knowledge, knowledge of is activated when a need for it is encountered in action	The statement of the problem presented in Chap. 1 suggested that children are ready to contribute to the solution of social and global problems; these subprojects try to create proper knowledge to respond to children's readiness
Knowledge-building discourse is cooperative and concerned with shared understanding	My hope is that this book can create contacts with other scholars who are interested in this intervention research; a weakness of this project is that as a researcher I have worked alone, although I have cooperated fully with the class teacher
Authoritative information has value as long as it contributes to knowledge-building discourse	This project contributes to the knowledge of capacity development within schools; the Child Convention demands this and it is possible to do it!
Emergent understanding; new conceptual structures emerge through the interaction of simpler elements	The knowledge of what we did in the first, second, and third years together suggested that pupils can learn systematic thinking and use this in many different types of problem solving; this could also have a positive effect on their school results

The point raised in Sect. 7.1 was an attempt to take a step toward theorizing the intervention with the help of an action model. Section 7.2 focused on method (pedagogy) in the classroom. Section 7.3 was about deeper learning. Section 7.4 compared knowledge building and capacity building. Now, it is time to integrate all these into one or several accounts that can be used for theory building. I have to acknowledge that this was not an easy task. In order not to miss any vital point, I needed to consider many things including the following:

- The project's aims
- The tripartite construct
- The 12 conclusions and the three summary statements
- The five points drawn from Dewey
- Sensitizing concepts
- The ameliorative triangle, that is, the Child Convention (what should be done), neuroscience (what could be done), and pragmatist educational philosophy (how to do it)

After considering the above points, I realized that it is extremely difficult to make one single account. So, after many attempts, I succeeded in making a list of six accounts:

1. This first account is to operationalize Article 29 of the Child Convention regarding every child's right to develop her or his optimal mental development and schools' obligation to prepare pupils to have social responsibility.
2. Neuroscience can help us to be more specific about mental development. The capacity of the prefrontal cortex to organize thought, feeling, and action can be operationalized through the systematic use of the problem-solving model.
3. Pragmatist educational philosophy gives us some concrete principles for creating a classroom context.
4. Interactionist-developmentalist learning within the context of the three-level pedagogy develops each individual's capacity for mental development as well as each pupil's capacity to cooperate in groups. Individual development and social development have a proper chance to develop harmoniously.
5. Social problem solving is the content of interactionist-developmentalist learning. It is both the aim and the method (pedagogy) of that learning. Learning and mastering the use of a problem-solving model is vital in this process.
6. By presenting many different kinds of problems, engage pupils in understanding personal, social, as well as global problems and encourage discussions about possible solutions. This can prepare pupils for ameliorative preadaptation to the world.

The first three accounts are related to how to create a classroom context. Account four is about the quality and quantity of learning and development in that context. Account five includes learning and mastering the use of the social problem-solving model. Account six is about preparing pupils to be socially responsible. These accounts are used to build the (intervention-based) theory.

References

Bateson, G. (1972). *Steps to ecology of mind*. Chicago: University of Chicago Press.

Blumer, H. (1970). What is wrong with social theory. In N. Denzin (Ed.), *Sociological methods* (pp. 84–95). London: Butterworth.

Damasio, A. (2003). *Looking for Spinoza: Joy, sorrow, and the feeling brain*. New York: Harvest Books.

Dewey, J. (1910/1997). *How we think*. New York: Dover Publications.

Dewey, J. (1922/2002). *Human nature and conduct*. New York: Dover Publications.

Dewey, J. (1938/1998). *Experience and education (the 60th anniversary edition).* West Lafayette: Kappa Delta PI.

Donald, J. (2002). *Learning to think: Disciplinary perspectives*. San Francisco: Jossey-Bass.

Freire, P. (1996) *Pedagogy of the oppressed*. New York: Penguin Books.

James, W. (1890/1981). *The principles of psychology*. Cambridge, MA: Harvard University Press.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh*. New York: Basic Books.

Lyng, S., & Franks, D. (2002). *Sociology and the real world*. Lanham: Rowman & Littlefield.

McWhinney, W., & Markos, L. (2003). Transformative education: Across the threshold. *Journal of Transformative Education, 1*(1), 16–37.

Moula, A. (2005). *Population based empowerment practice in immigrant communities.* Linköpings universitet, Medical dissertation 887.

Mullen, J. (1995). *Hard thinking: The reorientation of logic to everyday life*. Boston: Rowman & Littlefield.

Pring, R. (2004). *Philosophy of educational research*. London: Continuum.

Scardamalia, M., & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge handbook of the learning sciences* (pp. 97–118). New York: Cambridge University Press.

Chapter 8
An Evolving Theory for Social Problem-Solving Literacy

Abstract This chapter attempts to build a new theory that is based on Child Convention or what should be done, insights from neuroscience or what could be done, and pragmatist educational philosophy or how to do it. On the basis of sensitizing concepts, review of extant theoretical propositions and collected data, an evolving theory that can be used for social problem-solving literacy is formulated in a single sentence. This new theory is called Neuropsychosocial Preparation Theory and can be described in the following words: Using insights from neuroscience and guiding principles from the Child Convention, schools can create contexts so that pupils can learn social problem solving in preparation for ameliorative preadaptation to the world.

> A major argument presented in this book is that theory-based research is essential if a field is going to advance. Theory has a number of advantages, including that it summarizes knowledge, has practical application, and helps guide the research process. (Shoemaker et al. 2004, pp. 168–169)

This book started with sensitizing concepts, then these concepts were applied in the research project, and now they must be developed further into a new theory. Connecting these three—sensitizing concepts, data, and theory building—to each other is a topic of much debate in science. Some journals devote much space to these methodologies. Hundreds, if not thousands, of articles, books, and book chapters are written about induction, deduction (and even abduction) to guide the process of empirical research. One way out of this "jungle of methods" is to stick to a selected method and proceed accordingly. What a researcher within this group needs to do is to master an established tradition and follow it. Others try to be more flexible and creative. This second choice is more difficult because there is a risk of making mistakes, but it gives the researcher a better chance to test new creative ideas and build a new theory. This research project has embraced this second route, which in traditional sense means that it is neither purely "inductive" nor "deductive." Throughout the research process, I have been reading about substantive

theory and, in line with Bendassolli (2013), I think that it is strange that some scholars have stated that there is a need not to review any of the literature in the substantive area of one's study! What if a researcher has much of this knowledge in her or his mind? To build a new theory, one can benefit—throughout the research process—from existing theories. But the story is not only about data and theory. Before starting the next sections, it is helpful to pay attention to the following explanation. With inspiration from Shoemaker et al. (2004, pp. 52–53), I make a classification to describe the four parts of the evolving theory: (1) statement of the theory—the essence or the main idea—which can be expressed through one or a few sentences; (2) the theoretical linkage including extant theories and concepts that provide support for the evolving theory; (3) the empirical linkages including the conclusions from the intervention; (4) arguments to support the evolving theory. Shoemaker et al. (2004, p. 52) emphasized that researchers should provide support for their evolving theory "in their own words using their own logic." These scholars added that all these parts "in combination, are the theory on which the study rests." Now, an explanation about how to proceed. The theory is presented in three sections: Sect. 8.1 and its two subsections include an introductory description of the evolving theory; Sect. 8.2 includes the statement of the theory; and Sect. 8.3 and its three subsections include a complementary description of the theory.

8.1   Theory, "Phenomena," and Data

First I refer to some definitions of what is meant by theory and then discuss the three components (theory, phenomena, and data) of empirical research. Maxwell (2013) defined theory as a set of concepts plus the proposed relationships among them, a structure that is intended to capture or model something about the world. Shoemaker et al. (2004) proposed that a theory is a set of systematically related generalizations suggesting new observations that can be tested. They add that "the purpose of a theory is to explain or predict" (p. 112). These scholars also indicated that theories are not discovered but rather constructed; a theory is a way of looking at the facts, of organizing and representing them. It took a while for me to realize and explicitly consider the importance of the fact that a researcher needs to be clear what the phenomenon under study is. Bendassolli (2013, p. 10) emphasized that "data itself may not be sufficient to sustain a theory" and, based on a tripartite theory-phenomena-data model, suggested that "phenomena should be directly explained by theory and only indirectly supported by the data." The paradox is that in order to "access" a phenomenon, theory is required, but to be innovative and create new possibilities of empirically reconstructing phenomena, it is also necessary to go beyond current theoretical frameworks. The paradox may reside in the ambiguity with which a phenomenon is often defined. On the one hand, we encounter definitions of phenomena as natural things, that is, something already present in nature that must be discovered by means of scientific method. On the

other hand, particularly according to some "radical" qualitative viewpoints, phenomena are considered just linguistic constructions. In such cases, reality is equated with the descriptions we give to it. This research with its neuropsychosocial approach avoids such a dualism. It builds on what is already present in nature, that is, the prefrontal cortex and its capacity in human beings, as well as on the well-planned social context to systematically use this capacity of the prefrontal cortex to achieve a goal.

Bendassolli (2013) suggested that phenomena are posited by theory in an empirical reconstruction process, meaning that empirical observation should not be disregarded but rather re-posited in existing theoretical networks or in those still to be created. These considerations pushed me to wonder what the phenomenon that I am studying is. Am I studying social problem solving? Or learning to solve social problems? What about the sensitizing concepts of being, becoming, responsible citizenship, capacity, and authority? Shoemaker et al. (2004) emphasized that creativity is an essential part of theory building. I realized that the key lies in the very ordinary word, preparation. Building a new concept and consequently a new theory out of a very ordinary term that is used daily in many different communications needed what Kandel (2006, p. 162) called "hard thinking". I searched Google (17 March 2015) and there were 441,000,000 results for "preparation," which confirms that it is a very common word. Although I "knew" what preparation meant, I referred to the Oxford Thesaurus (1992) to find out the various uses of the term preparation. I often use this method of searching for the meaning of a term in several sources including printed and web-based dictionaries, usually with good results. Often the words mean much more than what we have learnt about them. Consequently, I realized that I can develop the term preparation into an umbrella concept that gathers and integrates other concepts important for this research (Table 8.1).

To conclude this section:

> I realized that the phenomenon under study is about the neuropsychosocial preparation of pupils for responsible citizenship. Consequently, the ordinary word preparation should be transformed into a concept that simultaneously embraces the results of the intervention and gets support from the extant theories and concepts.

The quotation at the beginning of this chapter raises the importance of theory for research. Theory has helped me throughout the process of this subproject. Figure 8.1 shows what has helped me to build this new theory.

The reminder of this section includes two subsections, which together constitute what I call the introductory description of the evolving theory.

Table 8.1 The inclusive concept of preparation and sensitizing concepts

Preparation has several synonyms such as education,[1] groundwork,[2] process,[3] training,[4] fitness,[5] organizing[6] (Oxford Thesaurus 1992)		
The Why of Preparation The aim of this project is to create a new educational program on what I call social problem-solving literacy. In practice, I educate pupils. Preparation as education[1] covers Article 29 of the Child Convention which aims to develop pupils' mental capacity and prepare them to have social responsibility. It is important to add that the word education includes both teaching and learning. So learning is a kind of preparation	*The What (Content) of Preparation* Preparation as groundwork[2] covers the concept of being and how, in this research project, I emphasize developing pupils' sociocognitive capacity as a necessary groundwork[2] in schools	*The How of Preparation* Preparation as a process,[3] training,[4] fitness,[5] and organizing,[6] covers the concept of becoming and how pupils in the process of training in social problem solving find their own fitness through learning to organize several capacities

8.1.1 The Philosophical Assumptions for Building the Theory

This first subsection is devoted to the philosophical basis of the evolving theory. Blumer (1980) has summarized George Herbert Mead's pragmatist tenets in the following points: (1) there is a world of reality "out there" that stands over human beings resisting actions toward it, (2) this world of reality becomes known to human beings only in the form in which it is perceived by human beings, (3) thus, this reality changes as human beings develop new perceptions of it. In other words, the real world does not have a basic intrinsic, fixed makeup but may change as human beings reconstruct their perception of it (Blumer 1980). I refer to this as the Mead-Blumer tenet because it is Blumer's clarification of Mead (Blumer was Mead's doctoral student). These tenets of pragmatism can be translated into some assumptions for this intervention research:

1. The world's problems such as war, poverty, and climate change are realities that cannot be denied. Neither can we ameliorate them so easily; they resist.
2. Realities will be (partially, but importantly) known to pupils because they are presented by teachers in schools.
3. The perception of these realities can change if teachers present new facts and engage pupils in understanding and reflecting about these realities.
4. Schools can, and according to the Child Convention and the Committee on the Rights of the Child should, develop a program to prepare pupils for performing social responsibility.
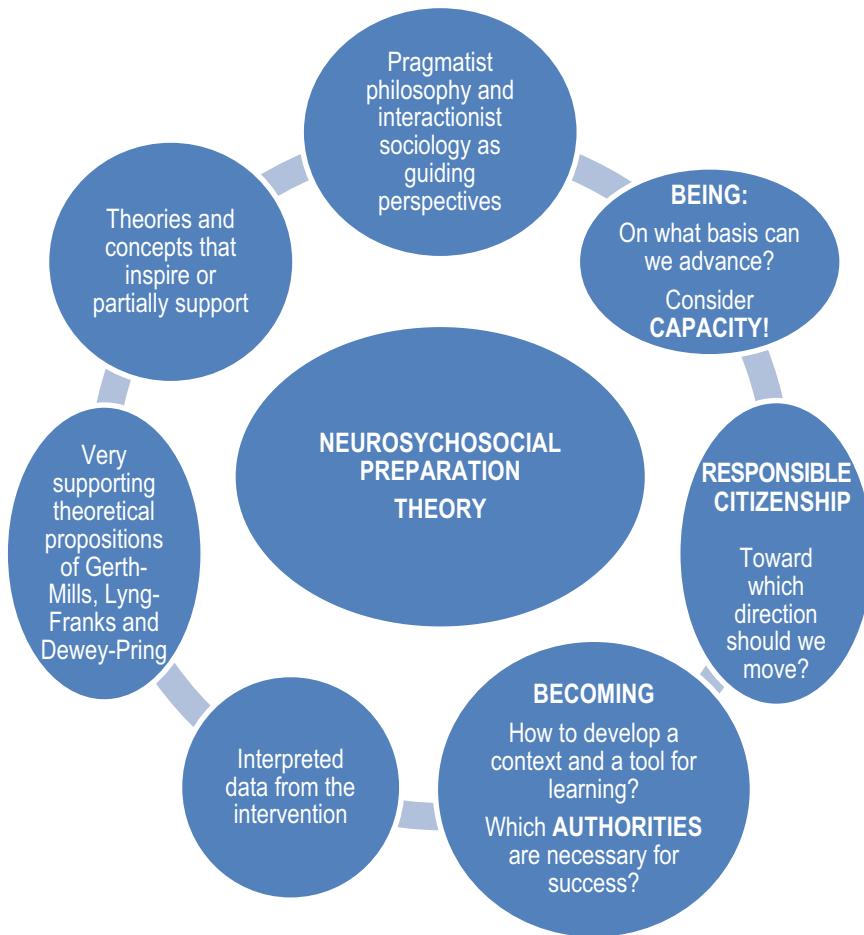
Fig. 8.1 The new theory is built on the concepts of being, becoming, responsible citizenship, capacity, and authority. Its starting point is Mead-Blumer's pragmatist tenet. This gets good support from Gerth-Mill's theory, which was recently confirmed by Lyng and Franks

These four assumptions build the philosophical groundwork for creating a theory about the preparation of pupils by schools.

8.1.2 The Challenge of "Acknowledging-Finding"

The fourth point of Chap. 2 on open research was about open communication with readers and describing moments of learning that may be of interest to other researchers. Here, I want to tell the readers about a challenge that can be called

"acknowledging-finding." This can happen in any research process in our era of the Internet. A researcher struggles hard at some period of time and tries to use what Dewey (1910/1997, p. vii) called "scientific attitude of mind" including "ardent curiosity, fertile imagination, and love of experimental inquiry" by putting together bits of a research Lego to reach her or his promising finding. One finds something, but then realizes later that this finding, in one way or another, has already been presented by others. Is this a moment of joy or sadness? And what should be done now? I learned to see this challenge as "acknowledging-finding" meaning that what others have said, and I was *not* aware of that, acknowledges my findings. This happens when an extant concept or theory acknowledges what you found in your own research process.

Two such acknowledging-findings are crucial for my theory. The first is the statement of Gerth and Wright Mills from 1958 that was taken up and accredited more recently by Lyng and Franks (2002) and the second is Pring's (2007) interpretation of some of Dewey's main ideas. I reflect on these two statements by connecting them to the sensitizing concepts of this project. Let us start with the statement of Gerth and Wright Mills

> Learning is anchored in the feelings and impressions which are both prerequisites and consequences of actions.[1] We learn to experience our self as an organized and mobile unit in opposition to inviting and challenging features of the environment.[2] The realities of the world and the capacities of our own bodies are learned together[3]; both come to us in terms of resistance and mastery, limitation and capacity.[4] We get an image of what can be done with our organic equipment[5] by learning what can't be done and sometimes suffering from the consequences of trying. (Gerth and Mills 1958, p. 75; Lyng and Franks 2002, p. 14–15) (markers are added)

I will "read" this statement for this research project by "reconstructing" it with consideration of the five concepts of being, becoming, responsible citizenship, authority, and capacity (or capacity development).

1. The statement includes four sentences; all the sentences are about learning. Therefore, it is possible to state that this is a statement about learning.
2. Marker 1 connects learning to feeling and action. This is in line with Immordino-Yang and Damasio (2007, p. 196) who emphasized that we learn because we feel. "When we educators fail to appreciate the importance of students' emotions, we fail to appreciate a critical force in students' learning. One can argue, in fact, that we fail to appreciate the very reason that students learn at all."
3. Markers 2 and 3 put learning at the meeting of individuals and their societies, and in a unique way—considering this research project—connect what is out there to what develops within individuals. Gerth and Mills (1958) wrote that the realities of the world and the capacities of our own bodies are learned together. If teachers in Sweden (indeed anywhere) take up the issue of poverty in Africa, explain it, and work with it, pupils' capacities for understanding poverty and for doing something about it develop accordingly. This is what Dewey and Mead repeatedly wrote about in avoiding the dualism of who creates who; individuals

create society or society creates individuals (see Dewey's *Education and Democracy*, 1916, or Mead's classic book *Mind, Self and Society*, 1934). This is in line with what Lyng and Franks (2002) called transactional learning; learning changes individuals and developed individuals change their world.

4. Marker 3 can also be read with consideration of how pupils can "organize" their problem-solving actions according to the problems existing in their world.
5. Marker 4 can be read on the basis of the capacity of the prefrontal cortex; pupils can develop their problem-solving capacity and, after a period of training, can master its use. This is what James (1890, 1899) and Dewey (1922) referred to as the habits of mind.
6. Marker 5, "what can be done with our organic equipment," can be connected to the idea that pupils learn about their authority within or the capacity of the prefrontal cortex in order to organize their thoughts and actions. This is what Mead (1934) called internal and external organization of action.

The second "acknowledging-finding" statement belongs to interpretations of Pring (2007), an educational philosopher of our time and an expert on John Dewey. This statement has much relevance for this project and the neuropsychosocial preparation theory. The quotation is marked with nine numbers to signify nine ideas that can be applied in building the theory. In Gerth-Mills' statement, the focus is on learning (this term is used four times); in Dewey-Pring's statement, the focus is on interaction (used four times). In other words, Gerth-Mills' statement presents the idea and Dewey-Pring's statement pays more attention to the details of what should happen in the classroom. I present the statement with markers (note that some markers/numbers can appear more than once) and then interpret them for this intervention research:

> Dewey constantly talks of the learner[1] as a living organism,[2] which, to survive, needs to adapt to changing circumstances.[3] But he sees the limitations of the purely biological[2] metaphor. That interaction[3] is not so much one of a biological organism interacting[3] with another, but of a social being[4] interacting[3] with other social beings[4] and with the artifacts[5] and institutions[6] on which other human beings have left their mark. That interaction[3] can also be with the 'accumulated wisdom of the race'[7] if that is made accessible to the living, experiencing,[8] problem-solving[9] 'organism'.[2] (Pring 2007, pp. 44–45)

If we read this statement through the nine markers, we have several points to discuss (I start with point 7 to continue my reflections on the Gerth-Mills' statement, which ended with point 6):

7. Pupils like all other human beings are neuro-biological beings. Pragmatists, who were deeply influenced by Darwin (see Dewey 1997, on the influence of Darwin on philosophy), understand human beings as part of nature. Unlike pragmatists, Pring (2004, 2007) does not show much interest in biology (to be precise I am talking about the brain and neuroscience; for example, see James' book *Principles of Psychology*, or Mead's *Mind, Self and Society*).
8. Pupils are biological beings, however, they are also social beings who interact with their social environment as well as the natural environment.

9. Pring with reference to Dewey writes about young people as learners.

10. Pupils' interaction with each other, with the teacher and the researcher in the classroom. Learning becomes deeply social and pluralistic, that is, pupils become familiar with how others think about knowledge and learning.

11. Pupils' interaction with artifacts. This subproject emphasized learning through an artifact/tool, a problem-solving model. Pring indicated the importance of pupils' interaction with the "accumulated wisdom of the race" if that is made accessible by schools. Indeed, I am wondering if the problem-solving model and its steps can be seen as one of the accumulated wisdoms of the human race. As mentioned in Chap. 3, this model and its steps are so widely used that no single scholar or philosopher can claim to be the founder of it. For example, who was the first human being who said in order to solve a problem in a situation you should define the problem? Or who was the first who said imagine several options, think about them and their consequences before choosing one for action? The oldest document that I found goes back to a text by the Iranian secular philosopher Zarathustra who lived about 3700 years ago (see *Avesta; Traduction des Gathas de Zarathustra*, by Sassanfar 2011, which is mainly in Persian or see Zarathustra 2007 in English). In that text, Zarathustra said that human beings are free to choose but with that freedom comes the responsibility for that choice. But it is difficult to claim that it was Zarathustra who coined that idea first. What is more correct is to assert that the ideas in the problem-solving model are so general and so common that they belong to the human race (see Chap. 3, Sect. 3.4.2).

12. Pupils' interaction with school as a social environment. This subproject is an intervention in the classroom. Schools are regarded as a very influential source for socialization of children (Dewey 1916).

Now I have laid the groundwork or what I called the introductory description of the evolving theory. The next section is an attempt to state/formulate the theory in a single sentence.

8.2   The Statement of the New Theory

In this section, on the basis of (1) sensitizing concepts, (2) extant theoretical propositions (i.e., the above 12 points) and (3) data (conclusions in Chaps. 6 and 7), an evolving theory that can be used for social problem-solving literacy is formulated in a single sentence. I have to acknowledge that putting a theory into a single statement is quite difficult, especially if the theory is about a multilevel phenomenon or what I call the tripartite construct: the individual level (capacity of the human prefrontal cortex), the interaction level (the intervention in the classroom),

and the societal level (learning what the social and global problems are). You are caught between the main ideas and many details. Nevertheless, if you want to express the idea in one sentence you have to be selective; you cannot say much in one sentence. I wrote the sentence many times and revised it again and again. Finally, I sent the sentence to two English language professors at my university to check the language and clarity of the idea. Here is the sentence marked with seven numbers to signify the seven main ideas in the evolving theory:

Neuropsychosocial Preparation Theory

> Using insights from neuroscience[1] and guiding principles from the Child Convention,[2] schools can create contexts[3] so that pupils can learn[4] social problem solving[5] in preparation[6] for ameliorative preadaptation to the world.[7]

This theory statement, explicitly and implicitly, connects the five sensitizing concepts—being, becoming, responsible citizenship, authority, and capacity—of this research project. Table 8.2 visualizes how each part of the statement is connected to these five concepts. It is important to consider that these five concepts are so tightly connected that it is difficult to think of them as separate/independent from each other. For example, when you talk about capacity, it inevitably includes being and becoming. Or without authority (power), you cannot create change/development to become something or someone else. Nevertheless, for the sake of simplicity, I have made a division to (mainly but not only) identify each of the three sources of the ameliorative triad (see Chap. 2, Fig. 2.1) with some of the sensitizing concepts:

- Considering the Child Convention, I focused on responsible citizenship (plus capacity and authority)
- Considering pragmatist philosophy, I focused on becoming (plus capacity and authority)
- Considering neuroscience, I focused on being (plus capacity and authority)

Table 8.2 shows markers 1–7 (see the statement of the theory), sensitizing concepts as well as what can be done, what should be done, and how to do it.

Table 8.2 Concepts in the statement of the theory

Marker	Concept
1: What can be done?	Insights from neuroscience include concepts of being, capacity, and authority. Being refers to human beings (with a brain) who have special capacities. Capacity refers to the capacity of the prefrontal cortex. Authority refers to neuroscientists' acknowledgment of the capacity of the prefrontal cortex
2: What should be done?	The Child Convention includes all five concepts, however, in this study the emphasis is on developing pupils' mental capacity to accept social responsibility. The Child Convention is an internationally recognized authority
3: What to do?	The context of the classroom refers to another legitimate power or authority. It is not common to refer to the classroom as an authority, however, this study is encouraging the recognition of this authority
4: What to do?	Learning or the capacity to learn is essential for change/development, that is, becoming (for example becoming responsible citizen)
5: What to do?	Problem solving, or to be precise, developing capacity for social problem solving refers to another authority, which is based on the power of the model that pupils learn. This model is a mental tool that facilitates operationalization of the concepts of being, becoming, and responsible citizenship
6: What should be done? What could be done? How to do it?	Preparation is the umbrella concept that connects all the other concepts to each other. Preparation bridges internal capacity and the capacity to understand what is going on in the world and how pupils can become prepared to meet the challenges of the world
7: What should be done? What could be done?	Ameliorative preadaptation is about how schools, by creating the proper context, can prepare pupils for responsible citizenship in the world. It is about not only understanding the problems but also learning how to ameliorate problematic situations

Table 8.2 shows how the five sensitizing concepts are closely connected to each other and justify that the statement of the theory is grounded in these concepts.

8.3   Complementary Description of the New Theory

Section 8.1 laid the foundation for the ideas behind the theory and Sect. 8.2 stated the theory and described its connection to the sensitizing concepts. This section and its subsections complement the evolving theory and are organized/presented according to what should be done, what could be done, and how to do it.

8.3.1 What Should Be Done: Child Convention's Directives for Schools Worldwide

In this project, I have emphasized that it is important to get direction from the Child Convention, interpret the content of this international document by science and philosophy, and prepare the situation for intervention. The question is why such a triad? Let us start with the Child Convention; it is an international convention that is ratified by almost all countries in the world, is law in some countries, and is becoming law in others. There are several reasons to start with the Child Convention. The author of this book has worked for more than 20 years with the Child Convention as a social worker within child organizations in Sweden and Iran, as a university teacher who teaches the Child Convention, and as a researcher who actively uses this document in research. These experiences are summarized in the following:

- This treaty is an authority that puts pressure on the states that have signed it to realize its content. It is a "tool" to push both democratic and non-democratic governments to take steps toward the best interests of children. In the most non-democratic countries, by referring to this document, a dialogue can be possible with governments just on the basis of the fact that these governments have signed this treaty.
- Although the Child Convention is not often used as a text for academic discussion, it can be used for realization of some of the best academic texts. The problem is that many researchers are not interested in reading it and consequently do not have deep knowledge of it. It took 10 years for many child experts from many countries to produce this treaty. When we read it carefully, we will be impressed by the logic, passion, and strength that tie all the articles to each other.
- It is the most accepted text that is used to interpret things from a child's perspective. In the same way that two individuals settle their disagreements about the meaning of a term by referring to (the authority of) a dictionary, people who work with children (individuals less than 18 years of age) make judgments by referring to this document.
- The Child Convention puts pressure at the top, at state level, to ameliorate the situation of almost two billion children. At the same time, through its articles it demands that all children in the world are properly educated and socialized; children are the future of the world. This is amelioration of the world from the bottom. This puts an end to the dualistic position of how to change the world from the top or the bottom. This position of the Child Convention is compatible with pragmatists' non-dualistic position of ameliorating the world.
- This document can create unity in diversity—unity about what is the best for a child. The "best" has much to do with how we define the best. In 1974, Francis J. Turner edited an authoritative text book for social work that included 14 theoretical alternatives for social work practice. In 2011, the fifth edition of this popular book includes 36 competing ways of doing social work. Turner (2011, p. 571) surprisingly concludes that the process of "the emergence of new

practice theories" will continue. How can social workers, teachers and all other personnel working with children know what is the "best" when they meet so many theories? Many practitioners believe that the Child Convention is an authority that can create unity in diversity. These practitioners can read and believe in various theories but they can (and should according to the Child Convention) find a common platform to act for the best interests of children. The Child Convention is just such a platform.

After these introductory points, let us look at the relationship between the Child Convention and the main five concepts more specifically. The Child Convention is about children (all human beings less than 18 years of age). These beings have many rights, however, this research project is focused on pupils' rights to develop their mental abilities to their fullest potential, as well as learning to have social responsibility (Article 29).

I quote the formal document of the United Nations (The Aims of Education, United Nations' document number CRC/GC/2001/1), which is focused on interpretation of Article 29 and mark sections of the text that are more relevant for this research:

> While article 28 focuses upon the obligations of State Parties in relation to the establishment of educational systems and in ensuring access thereto, article 29 underlines the individual and subjective right to a specific quality of education.[1] Consistent with the Convention's emphasis on the importance of acting in the best interests of the child, this article emphasizes the message of child-centred education: that the key goal of education is the development of the individual child's capacities in recognition of the fact that every child has unique characteristics, interests, abilities, and learning needs.[2] Thus, the curriculum must be of direct relevance to the child's social, cultural, environmental and economic context and to his or her present and future needs and take full account of the child's evolving capacities[3]; teaching methods should be tailored to the different needs of different children.[4] Education must [note the word must] also be aimed at ensuring that essential life skills are learnt by every child and that no child leaves school without being equipped to face the challenges that he or she can expect to confront with in life, basic skills include not only literacy and numeracy but also life skills such as the ability to make well-balanced decisions[5]; to resolve conflicts in a non-violent manner; and to develop a healthy lifestyle, good social relationships and responsibility,[6] critical thinking,[7] creative talents, and other abilities which give children the tools needed to pursue their options in life. (Markers are added)

Let us look at these seven markers and how they are relevant to this research project. Point one emphasizes the issue that Article 28 is about the right of every child to education, whereas Article 29, which is the focus of this research project, is about the quality of education. And as indicated clearly, education involves not only literacy and numeracy but other skills too. Marker two is about the crucial issue that this Convention very often uses the term the child instead of children to emphasize each child's needs and development. This emphasis is considered in this research project. Every time that we (the teacher and I) used the model, each pupil got the chance to think individually before sitting in groups and cooperating with each other (see Chap. 5 for more on this). Markers three and four refer to each child's evolving capacities, which is one of the five main concepts of this research project, as well as how teaching methods should consider different needs of different children. Marker five refers to the very interesting term of "well-balanced

decision" as a main ability that each child needs to learn to develop in school. This very ability is at the heart of problem solving. No problem solving can take place without one or more decision making.

> The freedom to make decisions is the most cherished and the most consequential of all liberties. By making up our mind to do something, we shape our future, and at times that of others. Like planning and creativity, of which it is a part, deciding to take action is projecting ourselves into the future. (Fuster 2013b, p. 126)

Decision making and problem solving are such closely related terms that over a period of time I was thinking of putting decision making at the heart of the project's aim and considered suggesting that, besides literacy and numeracy, there is a need for decideracy as a new subject in schools (see decideracy.com). However, I realized that problem solving is a much broader term. Problem solving is both an aim and a method; pupils should learn problem solving for their lives and engaging in problem solving develops many other cognitive capacities. Marker six refers to the duty of schools to create contexts so that pupils can learn social responsibility, which is another main concept of this research project. Marker seven is about thinking, which has been the focus of this intervention research.

In conclusion, Article 29 of the Child Convention is focused on two points: (a) every child's right to development of mental abilities and skills to make well-balanced decisions and (b) schools' obligation to create spaces so that children become prepared to accept responsibility for their social and natural environment (Fig. 8.2).

The next section is devoted to what could be done and how I draw from neuroscience, particularly insights from the prefrontal cortex.
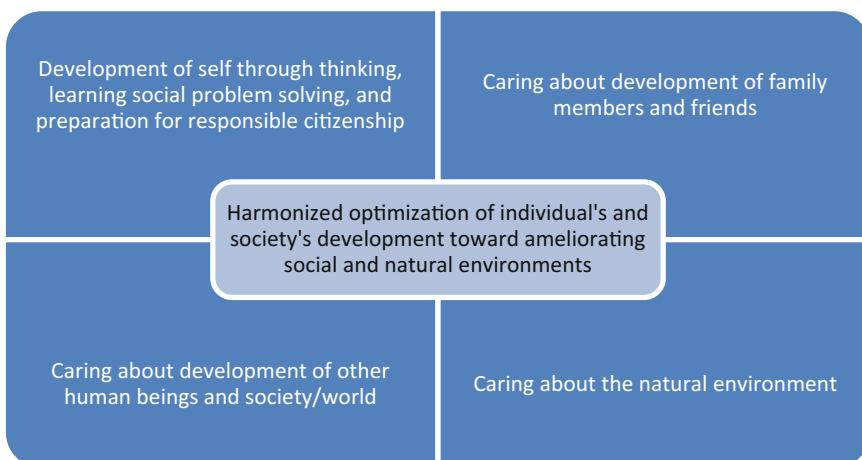

Fig. 8.2 The child convention, particularly Article 29, which is the focus of this research project, gives us direction about what or who the child should become

8.3.2   What Could Be Done? the Prefrontal Cortex, Executive Function, and Problem Solving

> One should not be afraid to try new things, such as moving from one field to another or working at the boundaries of different disciplines, for it is at the borders that some of the most interesting problems reside. Working scientists are constantly learning new things and are not inhibited from moving into a new area because it is unfamiliar. (Kandel 2006, p. 427)

Historically, 1848 was an important year for our knowledge of the role of the prefrontal cortex in the daily life of human beings. Phineas Gage was an American railway foreman who, while setting an explosive charge in 1848, had a 2-foot tamping iron blown through his frontal lobes when the charge backfired. Gage survived the accident and he could walk and talk, however radical changes occurred in his behavior. According to those who knew him well, Gage was no longer Gage. "He became reckless and improvident, impulsive, profane; he could no longer plan" or think of the future (Baars and Gage 2010, p. 51). Gage "had lost himself, the most central part of his being, and (as is the case with all patients with severe damage to the frontal lobes), he did not know it." (Sacks 2001, p. x, parentheses in original)

In this section, I suggest something that is yet not common among social scientists but has been completely accepted by pragmatist philosophers years ago! The issue is about interest in knowledge of the brain and the development of an individual's mental capacity by explicit reference to this knowledge within social sciences. Dewey, James, and Mead have been very clear on this point: "Emphasis upon natural tendencies and powers as the only possible starting-point of development is indeed wholesome" (Dewey 1910, p. 61). Morris (1934, p. xv–xvi) in his introduction to George Herbert Mead's most cited book *Mind, Self and Society* wrote that "psychology and sociology are united" upon a biological basis. But unfortunately, more than 80 years later, explicit use of neuroscience within social science is not widely accepted.

I first discuss the general role of the prefrontal cortex and then more specifically about the role of the prefrontal cortex in problem solving. There are some disagreements about the role of the prefrontal cortex. Cognitive neuroscientists, Purves et al. (2008) emphasized that the human brain must perform a broad array of complex functions, such as deciding among alternative courses of action, inhibiting irrelevant information while focusing on things of importance, reasoning through complex problems, spurring different components of the whole into action, and planning for the future. However, they warn us that no single part of the brain, no "homunculus" can be identified as the neural equivalent of chief executive. "Instead, several interrelated brain systems combine to support flexible and goal-directed control of behavior" (Purves et al. 2008, p. 579). Then, what exactly is the function/power of the prefrontal cortex in relation to other parts. Due to its neurobiological position, the prefrontal cortex is connected to many parts of the brain, and this gives it the power to organize and coordinate. It is possible to put the ideas of neuroscientists on a continuum about the role of the prefrontal cortex. On

the one hand, there are those who see the role of the prefrontal cortex as chief executive officer (Goldberg 2001, 2009). On the other hand, there are reductionists who downplay the special role of the prefrontal cortex. Fuster (2003, 2008, 2013a, 2013b), who is highly distinguished as an expert on the prefrontal cortex, explained the balanced position. Although Fuster does not agree with the role of the prefrontal cortex as chief executive officer, he did not fall into the opposite category when he indicated that

> Indeed, the reductionist analysis of its [prefrontal cortex's] areas and functions ignore the supraordinate role of the prefrontal cortex, where different areas cooperate closely with one another and with others in the posterior cortex. (Fuster 2013b, p. 158)

Fuster's position can be summarized in two main points: (1) in its internal role, that is, its role with other parts of the brain; the prefrontal cortex is the temporal organizer; and (2) it also plays the organizing role in the brain's relationship with the environment. Fuster is known for formulating this second point in terms of the perception-action cycle and the crucial role of the prefrontal cortex in this circular process. Accordingly, a circular pattern of influences is at work in behavior: from the environment on the organism through sensory receptors, from the organism on the environment through motor effectors, from the environment back to the organism again through sensory receptors, and so on (Fuster 2008, p. 358). Fuster is clear about this role of the prefrontal cortex: "The prefrontal cortex sits at the top of the cycle, controlling temporal integration and the sequencing of actions." This position fits very well with pragmatists' emphasis on escaping dualism in the relationship between human beings and their environment (see Campbell 1995). Fuster (2008, p. 3) reflects the overall position that neuroscientists and particularly neuropsychologists maintain about the operations of the prefrontal cortex as "*executive*" functions (emphasis in original). Now I try to describe the executive functions. Let us start with some examples of executive functions in daily life.

> A driver on a dark road slams on his brakes as a deer darts out of the woods. A shopper considers whether to buy a fuel-efficient sedan or a flashy sports car. A player stares across a chess board at an opponent, anticipating the next move. Though drawn from very different domains of human activity, these examples all reflect the aspect of cognition known as executive processing. As the name implies, executive processes perform supervisory or regulatory roles; that is, they modulate the activity of other cognitive processes in a flexible and goal-directed manner. (Purves et al. 2008, p. 577)

It is not strange that there is disagreement about the role of the prefrontal cortex, its functions—executive functions—and its relation to the environment. The brain is the most complex system known with its 100 billion nerve cells. In 2010, 50 socially oriented neuropsychologists published an impressive collection of studies on *Self and Social Regulation: Social Interaction and the Development of Social Understanding and Executive Functions.* The fact that the term "social" is used three times in the title of the book reveals the orientation of these 50 scholars. In the first chapter of this voluminous book, Dick and Overton (2010, p. 8) wrote

> In the executive function literature, executive function defined as the function of the prefrontal cortex illustrates as a reductionism when these functions are presented as necessary

and sufficient causal conditions for the task performance. Establishing the neuropsychological organization necessary for cognitive functioning is an essential part of the explanatory process, but a necessary biological condition, in and of itself, provides little information about psychological meaning of the construct under investigation.

Fortunately, the most distinguished experts on the prefrontal cortex, such as Joaquin Fuster—as we saw by putting emphasis on the perception-action cycle—shows no reductionist position. Indeed, the position that is accepted in this research project and is completely in line with pragmatists is Mesulam's (2002) position that the prefrontal cortex provides *the capacity for reflection, change, and choice* but only through socialization and education can we provide content/quality for these capacities.

An individual can use the capacity of the prefrontal cortex to rob a bank or to plan a "perfect crime." Another individual can use this capacity for artistic creativity, scientific discovery, or ameliorative initiatives. That is why the Child Convention through Article 29 puts the two aims of mental development and social responsibility together.

Much more than mental capacity is necessary so that individuals can act responsibly in society. In other words, there is no guarantee that the prefrontal cortex can always and in all situations (1) overcome the difficulties in deliberately organizing human behavior in a goal-directed manner, and (2) facilitate choosing goals that are socially responsible. The human brain has other systems that are very powerful and can win over the prefrontal cortex's organizing role. Referring to the power of emotions and human urges, Joseph LeDoux, a distinguished authority on brain and emotions, wrote

> This is why a brilliant mathematician or artist, or successful entrepreneur, can like anyone else fall victim to sexual seduction, road rage, or jealousy, or be a child abuser or rapist, or can have crippling depression or anxiety. Our brain has not evolved to the point where the new systems that make complex thinking possible can easily control the old systems that give rise to our base needs and motives, and emotional reactions. This does not mean that we're simply victims of our brains and should just give in to our urges. It means that downward causation [that is from prefrontal cortex to more primitive parts] is sometimes hard work. *Doing* the right thing does not always flow naturally from *knowing* what the right to do is. (LeDoux 2002, p. 323) (Emphasis in original)

But, how to overcome these difficulties? The answer to this question is given by pragmatist philosophers with emphasis on learning something and training to the point that it becomes a habit of mind. Even neuroscience acknowledges this point (see Damasio 2010). This book has suggested that an effective way to train/develop one's systematic thinking, reasoning, and deliberative capacity is to engage in fictive problem solving. I described the role of the prefrontal cortex in general terms. Now I discuss its role in problem solving, which is at the heart of this study.

Fuster (2003, p. 234) explicitly indicated that "problem solving activates prefrontal cortex" and then explained that:

> The integrative role of the prefrontal cortex in problem solving is graded and adjusted to need. Three factors determine that need, with considerable trade-off between them: integrating time, complexity, and novelty… The three factors, singly or in combination, determine the degree of intervention of lateral frontal cortex in problem solving. In general, prefrontal cortical involvement correlates with the amount of effort that the subject must devote to solving the problem. (Fuster 2003, p. 236)

Now, let us put together the points in this statement and the problem-solving model that the pupils used in this study to see how this model activates the prefrontal cortex (Table 8.3).

From Table 8.3, we can clearly see that using the model and its steps inevitably includes cognitive management of time, complexity, and novelty. The first step is mainly about the present situation, but to understand the situation, the problem solver inevitably goes back and forth in time. The second, third, and fourth steps are mainly about the future. Therefore, the problem solver in her or his imagination "moves" between past, present, and future all the time. Steps 2 and 3 of the model are more about imagination, novelty, and creativity. Imagination in Dewey's understanding has a strong connection to deliberation and creativity. This point is so important that Steven Fesmire, a philosopher of our time, has devoted a whole book to *Dewey and Moral Imagination*. In connecting deliberation and imagination and by drawing on Dewey, Fesmire wrote

> In deliberation (moral, scientific, artistic), we singly or collectively hunt for ways to settle difficulties and ambiguities by scoping out alternatives and picturing ourselves taking part in them. Imagination continues until we are stimulated to act by a course that appears to harmonize pressing interests, needs, and other factors of the situation. (Fesmire 2003, p. 70)

Fesmire (2003, p. 90) also wrote that

> According to Dewey's theory of psychology of deliberation, imagination arises as the hunting phase of any situation involving perplexity. We probe optional futures and envision participating in them before acting overtly. A complete deliberation forecasts altered conditions that would ensue if this or that route were opted for, until an option is hit upon that can be trusted to integrate conflicting factors and restore equilibrium.

Table 8.3 The role of the prefrontal cortex's in a problem-solving activity (Fuster 2003) and the steps of the problem-solving model used in this intervention by the pupils

Role of the prefrontal cortex	Problem-solving model
The prefrontal cortex is activated if one or more of these three issues are involved in a problem-solving activity: Time Complexity Novelty	Steps of the problem-solving model: Understanding the problematic situation and definition of one or more problems Imagining a desirable situation Thinking of possible options for solution of problem Choosing the best option and planning for its realization

Moving between the steps of the model is about organizing a chaotic and problematic situation into a well-organized fictive situation. Fuster (2003) added that the more complex the problem, the more need for activation of the prefrontal cortex. It is beyond the scope of this book to devote space to what happens if a human beings' prefrontal cortex is damaged, but there is enormous evidence that serious damage to the prefrontal cortex badly affects reasoning and problem solving in human beings (for a good summary, see Mesulam 2002; and for details, see Miller and Cummings 2007). We can conclude that using the model for problem solving activates the prefrontal cortex (see Purves et al. 2008, Chap. 25) and the more complex the problem, the more need for prefrontal cortex activation.

Section 8.3.1 was about what should be done and Sect. 8.3.2 covered what could be done; the next section is devoted to how to do it.

8.3.3   How to Do It? Operationalizing the Executive Functions in the Classroom

In this section, by drawing on four sources (the Child Convention, pragmatist educational philosophy, executive functions of the prefrontal cortex, and the results of the intervention in this subproject), I try to create a rationale for problem-solving literacy. Consequently, this section has become the most loaded section (loaded with directives, knowledge, insights, and intervention results). Writing this section, which is probably the most important contribution of this research subproject, was the most difficult part of this book for two reasons: (a) the first difficulty was the issue of integrating four very different types of "knowledge"—Child Convention, neuroscience, pragmatist philosophy, and my 20 years of practical experience including the intervention results of this subproject; (b) the second difficulty was to create a structure to present this integration. Finally, I decided to mark the text by numbers and create a kind of structured list. The points were so tightly intertwined that it was difficult to "divide" them according to a list, nevertheless, I did my best.

In order not to miss any vital points, I used an essay written by the pragmatist social thinker Hayden Tufts (1917), an associate of Dewey. In this essay, which is a century old but fits well with recent studies of biopsychosocial beings, Hayden Tufts indicated that in studying life—that is, the interaction between organism and environment—four factors should be considered:

1. Life includes a biological process that should not be neglected in studying the human condition.
2. Interrelation with other human beings including grouping, cooperating, and communicating is the second factor in studying life.

3. Intelligence and reasoning, through which experience is interrelated, viewed as a whole, enlarged in imagination, is another important factor.
4. The process of judgment and choice in human beings' thoughts and actions is the fourth factor that should be considered.

As we see, these four factors encourage a holistic approach that can be used in studying many different social issues. The current study contributes to these four points through the concepts of thinking and amelioration. Regarding point 1, this study has considered the prefrontal cortex and its important role in thinking. Considering point 2, as we saw in the empirical section, the three-level (or three-moment) pedagogy emphasized the role of thinking through the use of the problem-solving model in the pupil's group work. Points 3 and 4 match well with the problem-solving model and model's usage by pupils. Four concepts are used in this section. The first is thinking. We think "when we are in doubt about how to act, what to believe, or what to desire" (Baron 2000, p. 6). The second concept is systematic thinking, which means thinking according to a system, for example, a problem-solving model with several tightly connected steps. The third concept is ameliorative systematic thinking, which is about systematic thinking with the aim of amelioration. Finally, amelioration of the world with the help of operationalization of the Child Convention in its entirety. This study has focused on the three first concepts, however, it is difficult not to think of operationalization of the Convention in its entirety. Figure 8.3 visualizes these four concepts with the help of what I call the concentric circles of thinking and amelioration. This figure illustrates (at least) the recognition of (a) the capacity of the prefrontal cortex as the starting point, (b) the fact that each smaller circle is an essential part of the bigger circles, and (c) the realization of the ameliorative impact of the Child Convention both through governments and schools.

Now, a rationale for what should guide activities in the classroom is presented. This rationale is based on the sensitizing concepts and experiential propositions (Chap. 3), the results of the intervention (Chap. 6), and the theoretical framework, including the extant theories and the new constructed theory—neuropsychosocial preparation theory (Chaps. 7 and 8):

1. The capacity for systematic thinking in human beings. The suggested concept of "ameliorative systematic thinking" refers to the Child Convention's demand for amelioration as well as every child's right to optimal mental development. As we will see, this term gets good support from neuroscience and pragmatist philosophy (according to a Google search, 15 May 2015, no one has used this term, or to be precise no one has registered this term on the Internet). Maines (2001, p. 3) wrote that people can think and they possess self-awareness. He added that despite the variation in cognitive abilities among people and the various conditions under which people may be more or less aware of themselves, "this statement of facts holds." The concept of capacity, one of the five major concepts of this book, plays a crucial role here. Many philosophers and scholars have paid attention to the concept of capacity development or capability development (for a recent example, see Nussbaum 2011).
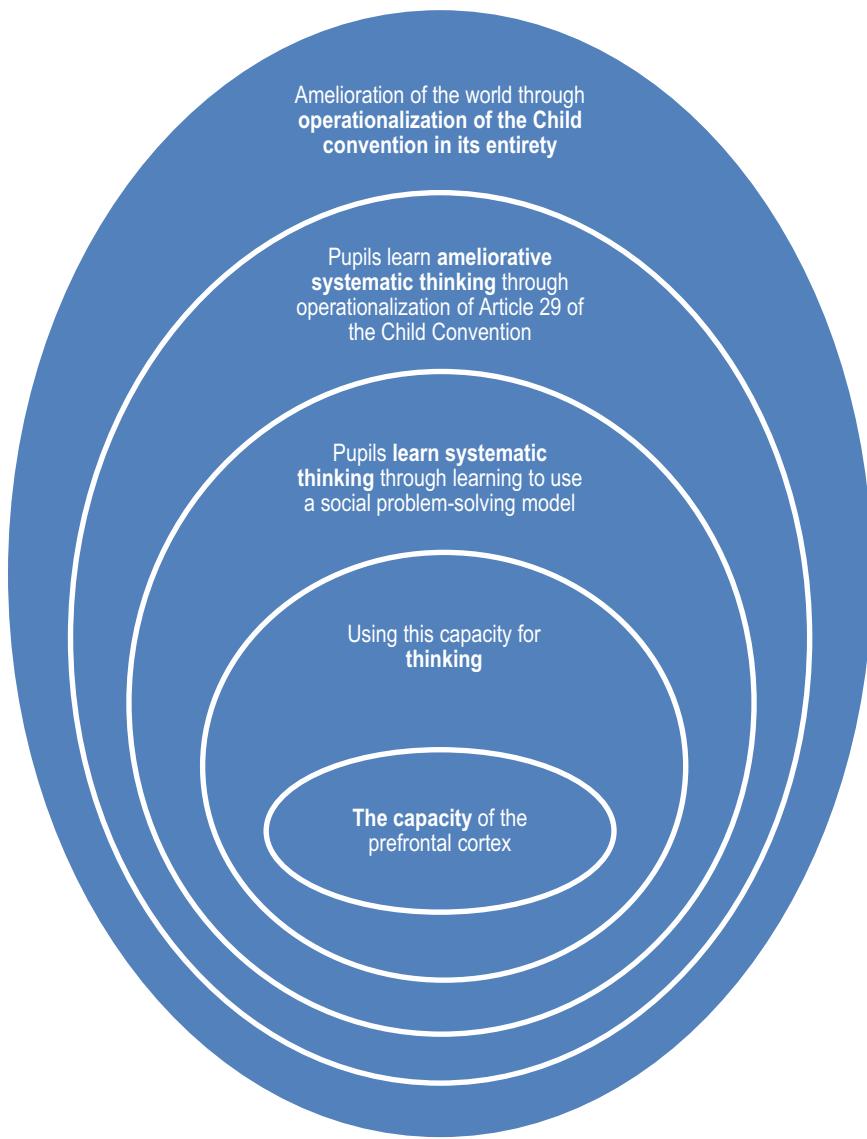
Fig. 8.3 Concentric circles of thinking and amelioration are built on Dewey's ideas and visualize the idea that schools in the world can start from the capacity of the prefrontal cortex and, with the help of the Child Convention, gradually ameliorate the world

> Yes. People can think. But as Dewey, James, and even if we go back to Aristotle, all have observed that the capacity for thinking is the first condition but to invest on this capacity through education and develop it toward systematic thinking (or reflective thinking or critical thinking) is the second condition.

What is crucial to consider here is that *the capacity for ameliorative systematic thinking does not develop automatically.*

2. People think systematically only when they need to do so. Generally and in daily life, human beings often act on the basis of habits and emotions, and they appeal to systematic thinking only when they really need to use this capacity. This fits well with our brain's economy, that is, using its systematic thinking power only when it is needed. According to Dewey (1910, 1922), human beings use their capacity to think systematically when they are confronted with a problem (to be exact Dewey used the words deliberative and reflective thinking).

3. Systematic thinking should be learned. In Chap. 3, Sect. 3.3, experimental proposition two suggested teaching triple thinking (including authorative thinking, reflective thinking, and preadaptive thinking) to pupils in schools. As we saw (Chap. 6), by using a problem-solving model in school, pupils can concretely use these types of thinking. Now, in line with these results and knowledge of the functions of prefrontal cortex (see Sect. 8.3.2), I use the term *systematic thinking* or stepwise thinking, that is, thinking that follows a system, which here is the problem-solving model. As the pretest showed, the pupils acted immediately in solving a problem. Gradually they learned that they can stop and think before deciding on the solution of a problem. Some scholars use the term executive function for what I have called systematic thinking in a problem-solving situation (Zelazo et al. 1997; Zelazo and Müller 2014). Good thinking is not something that is forced upon us in school, we have to learn it (Baron 2000).

4. The principles of problem solving. Ameliorative systematic thinking in a problem-solving situation involves some very common steps known to human beings and recognized by various disciplines. As mentioned earlier, Donald (2002) raised the advantages of problem solving in learning disciplinary knowledge. Neuroscientists, philosophers, psychologists, and social work theorists have all described a problem-solving model with some definite steps (see Sect. 3.4.2). Cognitive neuroscientists, Baars and Gage, wrote that

First, one needs to create a mental representation of both the current situation and the goal. Furthermore, these representations have to be linked by establishing which actions are needed to transform the current state into the goal state. Problems therefore have three general characteristics: (1) an initial state, or the state in which the problem solver sorts out the givens; (2) a goal state, or the solution state that the problem solver tries to achieve; and (3) the steps that the problem solver takes to transform the initial state into the goal state

that initially may not be obvious. (Baars and Gage 2010, pp. 349–350)

It is these three steps that I call the principles of problem solving. It is hard to imagine how anyone who wants to solve a prolem properly can escape one of these three steps. Swedish therapists Petitt and Olson (1994) have presented a similar problem-solving model with three parts: the present situation, the desirable situation, and what exists between these two stages including sources and barriers that are impeding moving from the problematic toward the desirable situation. Now, if pupils continuously use such a model to (fictively) solve problems, they master the use of this model. Each step in a problem-solving model is crucial for training a particular capacity. In the following points, these steps are discussed in some detail.

5. Understanding a situation and its problem(s). As Maines (2001, p. 3) stated, all forms of human activity occur in situations. "Situationless conduct is unknown among human beings." But if these situations are problematic situations, then, together with understanding of the situation, there will be a need for definition of one or more concrete problem(s). No matter if one is a philosopher, a scientist, an engineer, a physician or any other individual confronting a daily problem, one has to start by defining what the problem is. My experience of 20 years of teaching people problem solving confirms that this is the most difficult steps of the problem-solving model, simply because you first need to understand a situation, which can be very chaotic. Therefore, understanding the situation and formulating the problem in that situation are two inseparable mental acts. And the importance of the definition of the problem is not something that we can downplay; how one defines the problem in the first step affects all other steps.

6. Through systematic thinking, we can connect the defined problem to a desire for change and amelioration. Here, the role of desire and imagination are essential to give a person the energy and creativity to move from the problematic situation. "Imagination in Dewey's central sense is the capacity to concretely perceive what is before us in light of what could be." (Fesmire 2003, p. 65)

7. Systematic thinking can use imagination to pinpoint several possible options to "move" from the problematic situation toward the desirable situation. In the words of Dewey (1938, p. 82), "a desire may be converted into a purpose and a purpose into a plan for action." Dewey (1922, p. 313) connected desire and deliberation when he illustrated that "We use the foresight of future to refine and expand present activity. In this use of desire, deliberation and choice, freedom is actualized." Fesmire (2003, p. 67), with reference to Thomas Alexander, raised the role of imagination when he wrote that imagination is a phase of activity in which possible activities are envisaged in relation to our own situations, thereby amplifying the meaning of the present and creating the context from which present values may be criticized, thus liberating the course of action itself. Imagination is an operation in the present, establishing

continuity with the past, anticipating the future. Therefore, several options and their possible (imagined) outcomes should be thought of carefully before the individual chooses one for action. This is at the heart of what Dewey (1922) called deliberation. Years of working with the problem-solving model has taught me how important imagination and creativity are in finding options that we could not think of in the first place.

8. Systematic thinking needs the choice of the most suitable and available option. After deliberative consideration of several possible course of action, one has to make a decision and choose the best available option. This involves what Lyng and Franks (2002) called our move from words to deeds. Here, the act of decision making plays a crucial role. But proper decision making (step 4 of the model) hangs on deliberate consideration of the options before decision making (step 3). Proper decision making involves "*sufficient search for possibilities*," evidence, and the goals one has chosen (Baron 2000, p. 54, emphasis in original).

9. Systematic thinking does not conclude with action. After the act comes the evaluation of the act. Have we reached our goals? If not, why? This step of the model (step 5) was not used in this intervention because we were dealing with fictive problems. Pupils learned and used the four steps of the model only.

10. Systematic thinking needs training so that it can become a habit of mind. Even after the pupils learned the model, it was necessary to continue this learning through using it to solve many different kinds of problems. More importantly, pupils need to train in the use of the model over a long period of time. We (the teacher and I) encouraged pupils to use the model continuously over 3 years so for them it would become a habit of mind. More than a century ago, William James elegantly described the power of habits and the process that it takes within our brain when neuroscience did not exist as an academic discipline:

All our life, so far as it has definite form, is but a mass of habits—practical, emotional, and intellectual—systematically organized for our weal and woe, and bearing us irresistibly toward our destiny, whatever the latter may be. Since pupils can understand this at a comparatively early age, and since to understand it contributes in no small measure to their feeling of responsibility, it would be well if the teacher were able himself [and herself] to talk to them of the philosophy of habit in some such abstract terms as I am now about to talk of it to you…The plasticity of the living matter of our nervous system, in short, is the reason why we do a thing with difficulty the first time, but soon do it more easily, and finally, with sufficient practice, do it semi-mechanically, or with hardly any consciousness at all. (James 1899/2007, p. 49)

This intervention research has emphasized that systematic thinking and ameliorative systematic thinking should be learned and practiced to the point that they become a habit of mind. This habit is crucial for human beings as individuals, as members of groups, and as responsible citizens of the world.
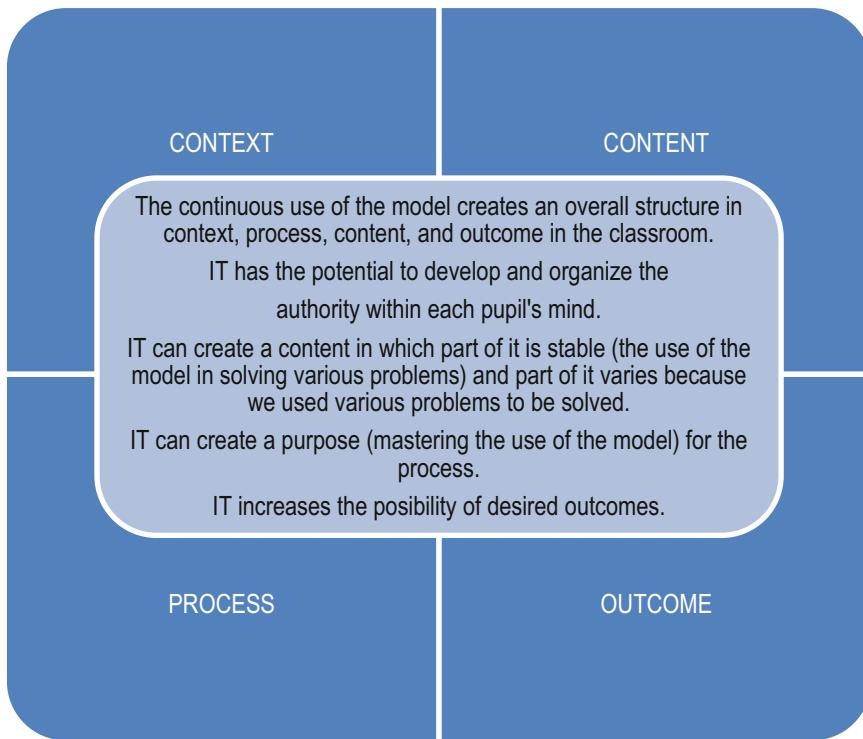
Fig. 8.4 The problem-solving model can create an overall structure within context, content, process, and consequently outcome of the intervention in the classroom

11. Learning to use a problem-solving model was at the heart of the intervention in the classroom. This model teaches systematic thinking (as the results of this intervention reveal). Systematic thinking includes deliberation (Dewey 1922), preadaptive thinking (Fuster 2013a, b), and reasoning (Lakoff and Johnson 1999). Figure 8.4 shows how the problem-solving model has the power to create a kind of order (structure) in context, content, process, and outcome of the intervention in the classroom, as well as create a structure in pupils' minds.

12. Systematic thinking should be at the heart of ameliorative preparation to achieve social responsibility. Systematic thinking is in line with Article 29 of the Child Conventions that each pupil has the right to optimal mental development. But this Article even demands that each pupil needs to become prepared to perform social responsibility. This intervention study understood this very well and, during the second and third years, the pupils trained in the use of systematic thinking to understand social and global problems.

This rationale and its 12 points, which should guide the activities in the classroom, are preliminary and will be developed through other subprojects. Therefore, both empirically and theoretically there is much scope to develop this rationale.

References

Baars, B., & Gage, N. (2010). *Cognition, brain, and consciousness: Introduction to cognitive neuroscience*. Amsterdam: Elsevier.

Baron, J. (2000). *Thinking and deciding* (3rd ed.). Cambridge: Cambridge University Press.

Bendassolli, P. (2013). Theory building in qualitative research. *Forum: Qualitative Social Research, 14*(1), 1–13.

Blumer, H. (1980). Mead and Blumer: The convergent methodological perspectives of social behaviorism and symbolic interactionism. *American Sociological Review, 45,* 409–419.

Campbell, J. (1995). *Understanding John Dewey*. Chicago: Open Court.

Damasio, A. (2010). *Self comes to mind: Constructing the conscious brain*. London: William Heinmann.

Dewey, J. (1910/1997). *How we think*. New York: Dover Publications.

Dewey, J. (1916/1944). *Democracy and education*. New York: The Free Press.

Dewey, J. (1922/2002). *Human nature and conduct*. New York: Dover Publications.

Dewey, J. (1938/1998). *Experience and education* (the 60th anniversary ed.). West Lafayette: Kappa Delta PI.

Dewey, J. (1997). *The influence of Darwin on philosophy*. New York: Prometheus Books.

Dick, A., & Overton, W. (2010). Executive function: Description and explanation. In B. Sokol, U. Muller, J. I. M. Carpendale, A. R. Young, & G. S. Iarocci (Eds.), *Self and social regulation: Social interaction and the development of social understanding and executive functions* (pp. 7–34). New York: Oxford University Press.

Donald, J. (2002). *Learning to think: Disciplinary perspectives*. San Francisco: Jossey-Bass.

Fesmire, S. (2003). *John Dewey & moral imagination: Pragmatism in ethics*. Indiana: Indiana University Press.

Fuster, J. (2003). *Cortex and mind: Unifying cognition*. New York: Oxford University Press.

Fuster, J. (2008). *Prefrontal cortex* (4th ed.). Amsterdam: Elsevier, Academic Press.

Fuster, J. (2013a). *The neuroscience of freedom and creativity: Our predictive brain*. Cambridge: Cambridge University Press.

Fuster, J. (2013b). Cognitive functions of the prefrontal cortex. In D. Stuss & R. Knight (Eds.), *Principles of frontal lobes functions* (2nd ed., pp. 11–22). New York: Oxford University Press.

Gerth, H., & Mills, W. C. (1958). *From Max Weber: Essays in sociology*. New York: Oxford University Press.

Goldberg, E. (2001). *The executive brain: Frontal lobes and the civilized mind*. New York: Oxford University Press.

Goldberg, E. (2009). *The new executive brain. Frontal lobes in a complex world*. New York: Oxford University Press.

Hayden Tufts, J. (1917). The moral life and the construction of values and standards. In J. Dewey & A. Webster Moore (Eds.), *Creative intelligence: Essays in the pragmatic attitude* (pp. 354–408). New York: Henry Holt.

Immordino-Yang, M. H., & Damasio, A. (2007). We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Mind, Brain, and Education, 1*(1), 3–10.

James, W. (1890/1981). *The principles of psychology*. Cambridge, MA: Harvard University Press.

James, W. (1899/2007). *Talks to teachers and students on some of life's ideals.* Charleston: BiblioBazaar.

Kandel, E. R. (2006). *In search of memory: The emergence of a new science of mind*. New York: W.W. Norton.

Khazai K. (2007). Introduction. In *The Gathas: The sublime book of Zarathustra (pp. 10-49)*. Brussels: European Centre for Zoroastrian Studies.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh*. New York: Basic Books.

LeDoux, J. (2002). *Synaptic self: How our brains become who we are*. New York: Viking.

Lyng, S., & Franks, D. (2002). *Sociology and the real world*. Lanham: Rowman & Littlefield.

Maines, D. (2001). *The faultline of consciousness: A view of interactionalism in sociology*. New York: Aldine de Gruyter.

Maxwell, J. (2013). *Qualitative research design: an interactive approach* (3rd ed.). Los Angeles: Sage.

Mead, G. H. (1934). *Mind, self, & society, from the standpoint of a social behaviorist*. Chicago: University of Chicago Press.

Mesulam, M. (2002). The human frontal lobes: Transcending the default mode through contingent encoding. In D. T. Stuss & R. T. Knight (Eds.), *Principles of frontal lobe function* (pp. 8–30). Oxford: Oxford University Press.

Miller, B., & Cummings, J. (2007). *The human frontal lobes: Functions and disorder*. New York: Guilford Press.

Morris C. (1934). Introduction: Mead as social psychologist and social philosopher. In G. H. Mead (Ed.), *Mind, self, & society, from the standpoint of a social behaviourist* (pp. ix–xxxv). Chicago: University of Chicago Press.

Nussbaum, M. (2011). *Creating capabilities: The human development approach*. Cambridge, MA: The Belknap of Harvard University Press.

Petitt B, & Olson H. (1994). (2: upplaga). *Om svar anhålles! En bok om interaktionistiskt förändringsarbete.* Stockholm: Mareld.

Pring R. (2004). *Philosophy of educational research*. London: Continuum.

Pring R. (2007). *John Dewey: A philosopher of education for our time?* London: Continuum.

Purves, D., Cabeza, R., Huettel, S. A., LaBar, K. S., Platt, M. L., & Woldorff, M. G. (2008). *Principles of cognitive neuroscience*. Sunderland, MA: Sinauer Associates.

Sacks O. (2001). Foreword. In E. Goldberg (Ed.), *The executive brain* (pp. vii–xiv). New York: Oxford University Press.

Sassanfar A. (2011). *Avesta: Traduction des Gathas de Zarathoustra*. Iran: Behjat Publication.

Shoemaker, P. J., Tankard, J. W., & Lasorsa, D. L. (2004). *How to build social science theories*. Thousand Oaks: Sage.

Turner, F. J. (2011). An interlocking theoretical perspective for treatment. In F. J. Turner (Ed.), *Social work treatment: Interlocking theoretical perspectives* (pp. 571–578). Oxford: Oxford University Press.

Urdang, L. (1992). *Oxford thesaurus* (American ed.). New York: Oxford University Press.

Zarathustra. (2007). *The Gathas: The sublime book of Zarathustra*. Translated with an introduction by Khosro Khazai. Brussels: European Centre for Zoroastrian Studies.

Zelazo, P., Carter, A. S., Reznick, J. S., & Frye, D. (1997). Early development of executive function: A problem-solving framework. *Review of General Psychology, 1*(2), 198–226.

Zelazo, P., & Müller, U. (2014). Executive functions in typical and atypical development. In U. Goswami (Ed.), *Childhood cognitive development* (pp. 574–603). UK: Wiley Blackwell.

Chapter 9
The Power of Systematic Thinking.
A Challenging Comparison: The
Middle-Aged Iranian Mother
and the Swedish Teenager

Abstract In this chapter two individuals from two projects are compared. There were no similarities between these two individuals. One is a middle-age Iranian woman, the mother of several children who struggles hard to manage her life and her children's lives as a single mother. The other is a 13-year-old Swedish girl. These two individuals are from two very different societies; Iran and Sweden. But they revealed very similar capacities, particularly in understanding and using the problem-solving model. They also voluntarily wrote texts that, in comparison with other participants in their own groups, were very long. Comparative analysis of the texts of these two individuals reveals that

- The comparison—not only between these two individuals but even between the projects in Iran and the subprojects in Sweden—urges us to pay more attention to non-cultural factors, such as the capacity of the prefrontal cortex in human beings.
- To invest in this neurobiological capacity of human beings—either Iranian adults or Swedish youths—can be very promising. Psychological tools can play an effective role in this investment.

Keywords Capacity of prefrontal cortex in all human beings · Psychological or mental tool · Empowerment of adults and children

During the first year of this intervention, I discovered an exceptional pupil in the classroom. A Swedish teenager (I call her Hortensia Junior) showed great interest in the first subproject. Especially she revealed her ability to write. Hortensia Junior came twice to the university and attended my classes when I taught social problem solving to social work students. The capacity of this 13-year-old pupil to follow my lecture and then write a "report" after attending the university was remarkable. It is informative to present her "report" in order to reveal her ability and understand the power of her "thinking on paper."

9.1   Hortensia Junior's Text

Her text is in Swedish. I have translated it

Rahyab—reflection on a lecture
My father drove me to the University on Wednesday morning. It was cold and from the car's window I could see the gray sky. The university was huge and the walls of the front side were made of glass. It was a building with several floors. We met Alireza at the reception. After I said goodbye to my father, I and Alireza walked toward the classroom there he had a lecture for social work students.

In Persian language Rahyab means finding a way. Rahyab was the name of a problem-solving model that Alireza was teaching to his students. Since in this class the students are educated to become social workers, so I tell you what I have learned from that lecture from the perspective of a social worker [Wow! Notice the words of a 13-year-old pupil!].

Alireza talked about the concept of "expert-expert," and that means as a social worker one should not put oneself in a higher position than the client. As social workers, we cannot understand the situations of clients better than they understand their own situations. We cannot choose the solutions for them. We should empower them to choose their own ways! Every human being is the expert of her own life. We (social workers) are the manager of dialogue between social workers and clients; this means we are trained to use theories and concepts in empowerment-oriented social work. We are good to arrange a dialogue and go on in that conversation.

One could see the dialogue as a funnel, at the top we have an unorganized story, but through the conversation, the story becomes more and more organized. In the first step of the model, the social worker and the client, define the problem through dialogue. Often individuals realize that there are several problems, which are intertwined. The same logic is true about the whole model. One should not see the steps in isolation from each other, they are tightly connected. For example, when we are in the second step of the model and the client is imagining the desirable situation, we can go back to the first step where we wanted to define the problem. Sometime by knowing what one wants, we can realize what it is that the person does not want.

Through dialogue, the social worker and the client try to find several possible options for solution of the problem (step 3). In this situation, we have to find answers for the following questions:

- What are the possible consequences for each option?
- Which resources are available for each option?
- What possible barriers may exist and impede against realization of each option?

We should consider and discuss the client's emotions and how they are connected to the options under discussion. We should also consider what possible role other people can play in realizing each alternative. Another human being can be a source, a barrier, or both. The social worker can be active in suggesting different

options for solution of the problem, but it is the client who should choose the best available option (step 4). So, the dialogue continues up to the point that the client sees herself ready to choose the best option. After choosing the best option, the dialogue continues to formulate a goal and create a plan to realize the chosen option.

We should also consider how the client's choice affects others (e.g., family members). Finally, step 5 of the model is about evaluation of what the client has done.

During the lecture Alireza also talked about the prefrontal cortex of the human brain and its important role for reflection, change, and choice. This part of the brain also helps to control our emotions so we do not become angry or sad. Emotions are important because without them we cannot be human beings.

9.2 Analysis of Hortensia Junior's Text

Following Labov (1972) and Cortazi (1993, 2001), I chose a structure with six steps to analyze Hortensia Junior's text: (1) an abstract that summarizes the point or states a general proposition that the narrative is supposed to exemplify; (2) an orientation to give details of time, place, persons, and situation, (3) a complication to give the sequence of the main event and show a crisis, problem, or turning point; (4) an evolution to highlight the point and distinguish it from other issues; (5) a resolution to show the results of or resolution of the complication; (6) a coda to finish the story. The analysis is presented briefly using these steps.

1. Abstract: A 13-year-old pupil attends a university class, sits among social work students, understands the lecture, and writes a "report" about it. Her capacity to attend the lecture mindfully, focus, take note, and then write about it is impressive.
2. An orientation: On that day, I was teaching how social workers can use a problem-solving model to create a dialogic space and empower their clients toward solution of problems. Hortensia Junior could completely follow what was happening in that class.
3. A complication: Hortensia Junior followed the 4-hour long lecture, understood almost everything, and wrote about it. Considering her age, my wonder is her understanding of what was said in that lecture and writing it in a precise way.
4. An evolution: No other pupil from that school-class showed an interest in attending my university classes.
5. A resolution: I cannot completely understand this exceptional case and explain it at this stage of this subproject. However, it is possible to see her power of thinking and writing. Hopefully further subprojects can help us to better understand this phenomenon.

6. A coda: After 18 months, Hortensia Junior left that school and consequently the project, but there are many questions for which we must find answers. In the next section I compare Hortensia Junior with Hortensia Senior.

9.3 Problem of Presenting Such a Case

As I wrote in Chap. 2, one of the characteristics of open research is taking up some methodological challenges and communicating with the readers. Here is one such example. I did not know how to present Hortensia Junior's case. I sent a mail to the "list-serve" of the Society for the Study of Symbolic Interaction, of which I was a member. I wrote a few lines about my research project and this exceptional case and told them about my uncertainties: if I present this case, will it hurt the whole project; if I do not present it, have I covered up part of the reality of this project. What should I do? I received three suggestions from members of the list-serve:

1. You do not need to make a big deal out of this case; it is the whole class that is important.
2. You have to include this case too; it is part of your data.
3. Put it in an appendix as a separate story.

Three different suggestions, each with its own logic. As I was wondering what to do, my doctoral student and I discovered a similar case in the project she was running in Iran. She had two intervention projects about empowering women in Iran. A total of 25 women were engaged in these two projects. A middle-aged woman and the mother of several children, we called her Hortensia, who did not even have a high school diploma, showed an exceptional capacity to think, use the problem-solving model, and write thoughtfully and reflectively. Besides the four papers we published about these two Iranian projects (Addelyan Rasi et al. 2012a, b; Addelyan Rasi 2013; Addelyan Rasi and Moula 2015), we also published a fifth paper to describe Hortensia's case (Moula and Addelyan Rasi 2014). There were no similarities between these two individuals. One is a middle-age Iranian woman, the mother of several children who struggles hard to manage her life and her children's lives as a single mother. The other is a 13-year-old Swedish girl. These two individuals are from two very different societies; Iran and Sweden. But they revealed very similar capacities, particularly in understanding and using the problem-solving model. They also voluntarily wrote texts that, in comparison with other participants in their own groups, were very long. These similarities are summarized in Table 9.1.

Unfortunately, Hortensia Junior left that school (and consequently the project) in the middle of the intervention's second year. Before leaving, she was engaged in the

Table 9.1   Similarities between Hortensia Senior and Hortensia Junior

	Interest in project	Showed patience for thinking	Capacity to understand the model and use it	Capacity to write thoughtfully and reflectively
Hortensia Senior	Very good. Voluntarily gave us lengthy text about the project in Iran	Exceptional	Exceptional	Exceptional
Hortensia Junior	Very good. Voluntarily gave us lengthy text (see Chap. 6, Sect. 6.7.2)	Exceptional	Exceptional	Exceptional

Exceptional here means exceptional compared with other participants in the respective projects.

group who were working to provide a text about climate change. She gave us the text for that group (see Chap. 6).

An important part of the aims of the projects in Iran and the subprojects in Sweden was to find out how people (adults in Iran and youth in Sweden) can learn to use a problem-solving model. Both projects in Iran and the subprojects in Sweden suggest that, by using a mental tool, we can sociocognitively empower people no matter whether they are Iranian adults or Swedish youth. The same method (or pedagogy) was used in both countries; encouraging people to write through systematic thinking and using a model to solve a problem. This capacity of people can be connected to how Vygotsky and his followers use the concept of a psychological tool:

> Psychological tools are those symbolic artifacts—signs, symbols, texts, formulae, graphic-symbolic devices—that help individuals master their own "natural" psychological functions of perception, memory, attention, and so on… The concept of psychological tools offers a fresh perspective in the study of comparative cognitive development, classroom learning, class-cultural differences in cognition, and the possible ways of making education more attuned to the needs of teaching thinking and creative problem-solving. (Kozulin 1998, p. 1)

Kozulin (1998, p. 80) added that problem solving as a function undergoes "a radical transformation" once it becomes involved in the activities mediated by psychological tools. The acquisition, internalization, and use of psychological tools are "essential elements" of the cognitive aspect of instruction (Kozulin 1998, p. 85). Psychological tools are capable of "organizing individual cognitive and learning processes in different contexts and in application to different tasks" (Kozulin 1998, p. 86). "Moreover, students' own thinking and problem-solving activity can be presented as a model with the help of psychological tools, thus becoming an object of the students' conscious deliberation, planning, and decision making" (Kozulin 1998, p. 160). Participants in the Iranian projects and the subprojects in Sweden very clearly show how using the problem-solving model created consciousness about how they thought before learning the model and how they think after learning to use the model.

9.4   Conclusions from These Two Projects and the Need for Further Research

Some researchers remind us that knowledge in action research is often derived from deep knowledge of one case (Friedman 2006; Bradbury and Reason 2006). Hortensia Senior and Hortensia Junior revealed capacities that cannot be directly connected to cultures. There is nothing similar between these two individuals. Neither is there much in common between the two societies of Iran and Sweden in which they live. Here are some preliminary conclusions.

- This comparison—not only between Hortensia Senior and Hortensia Junior but even between the projects in Iran and the subprojects in Sweden—urges us to pay more attention to non-cultural factors, such as the capacity of the prefrontal cortex (for reflection, change, and choice) in all human beings.
- To invest in this neurobiological capacity of human beings, either Iranian adults or Swedish youths, can be very promising. Psychological tools can play an effective role in this investment. Further comparative research is necessary before making any generalizations.

The two projects in Iran were empowerment-oriented projects that took place within the context of intervention research in social work tradition. The two school subprojects in Sweden cannot be seen as traditional social work, that is, meeting people who already have problems, but as an innovative activity preparing pupils for preadaptation to an increasingly complex world.

References

Addelyan Rasi, H. (2013). *Empowering women in the Middle East by psychosocial interventions*. Linköping University Medical Dissertation No. 1320.

Addelyan Rasi, H., & Moula, A. (2015). Towards a conceptual framework for socio-cognitive empowerment: Lessons from intervention research with women in Iran. *Clinical Social Work*. doi:10.1007/s10615-015-0518-5

Addelyan Rasi, H., Moula, A., Puddephatt, A. J., & Timpka, T. (2012a). Empowering single mothers in Iran: Applying a problem-solving model in learning groups to develop participants' capacity to improve their lives. *British Journal of Social Work, 2012,* 1–20. doi:10.1093/bjsw/bcs009

Addelyan Rasi, H., Moula, A., Puddephatt, A. J., & Timpka, T. (2012b). Empowering newly married women in Iran: A new method of social work intervention that uses a client-directed problem solving model in both group and individual sessions. *Qualitative Social Work*. doi:10.1177/1473325012458310

Cortazi, M. (1993). *Narrative analysis*. London: Falmer Press.

Cortazi, M. (2001). Narrative analysis in ethnography. In P. Atkinson & S. Delamont (Eds.), *Handbook of ethnography* (pp. 384–394). London: Sage.

Friedman, V. (2006). Action science: Creating communities of inquiry in communities of practice. In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. 131–143). London: Sage Publications.

Kozulin, A. (1998). *Psychological tools: A sociocultural approach to education*. Cambridge, MA: Harvard University Press.

Labov, W. (1972). The transformation of experience in narrative syntax. In W. Labov (Ed.), *Language in the inner city*. Philadelphia: University of Pennsylvania Press.

Moula, A., & Addelyan, Rasi H. (2014). Empowering marginalized people by maximizing reflective intelligence: A pragmatist problem solving approach. *Social Sciences, 3*(6), 189–198. doi:10.11648/j.ss.20140306.12

Reason, P., & Bradbury, H. (2006). Preface. In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. xxi–xxxii). London: Sage Publications.

Chapter 10
Discussion

Abstract In an innovative act, I suggested an evaluative system that researchers can use to practice hard thinking when reflecting on their own research. Hard thinking is defined as the confidence, willingness, and skill to use one's reasoning powers to develop clear viewpoints, to argue for those viewpoints, to seek and accept others' skilled evaluations of one's own positions, and to evaluate intelligently the viewpoints and arguments of others (Mullen in *Hard thinking: the reorientation of logic to everyday life.* Rowman & Littlefield, Boston, 1995, p. 4). The evaluative system includes three subsystems: (1) through the first subsystem, a researcher puts together components of her or his research including the methodology and the underlying principles, the aim and research questions, and conclusions of research analysis, (2) the second subsystem includes the sources and theories that the researcher has used, and (3) the third subsystem is about a table of description and selection, representation, inference and synthesis, and finally verification. I used this system to look at my research from the critiques I received from several peer reviewers who reviewed my manuscript.

Keywords A new system for practicing hard thinking within a research process · Quality in intervention research

There are many points that can be (or should be) discussed in this chapter, however, I decided to present the concept of "hard thinking" and by practicing it, organize the discussion. Sociology and social work at the Department of Social and Psychological Studies, Karlstad University, Sweden, had three common seminars in each semester. On 15 June 2015, the third seminar was held and it was devoted to discussion of the first version of this book. Three opponents, one external and two internal, read and critically discussed the manuscript with me at that open seminar. I also got some written comments and suggestions. To conclude; this volume has been peer reviewed twice: first at my university and later it went through Springer's peer review process. The comments I received from these two peer reviews and my own reflections that I have developed during the research process helped me to practice "hard thinking" in organizing this discussion.

10.1 Practicing Hard Thinking Within Research

Noble Prize winner, Kandel (2006, p. 162) indicated that "hard thinking, especially if it leads to even one useful idea, is much more valuable than simply running more experiment," and added that one should not make the mistake of confusing hard working with hard thinking! But what is hard thinking and how should we practice it within the research process? There is a popular phrase "It is the difference that makes difference." This book has emphasized that by learning to use a model, that is, systematic thinking, pupils can more easily and effectively solve (fictive) social problems. There is a great difference between using a model or not using a model in solving a problem. Even comparison with adults revealed such a difference (see Chaps. 6 and 9). Here, I propose that even researchers could follow a system/structure in their research process. Below I suggest a system comprising three subsystems. The first subsystem (Fig. 10.1) is the components of the first subproject, the second (Fig. 10.2) is the sources that I have used from the start of the project until the end, and the third (Table 10.1) is a subsystem for scientific thinking (mainly drawn from Donald 2002) plus a definition of what hard thinking is by Mullen (1995).

The Philosopher Mullen (1995, p. 4) in his book *Hard Thinking* defined this concept as follows:

> Hard thinking is the confidence, willingness, and skill[1] to use your reasoning powers to develop clear viewpoints, to argue for those viewpoints,[2] to seek and accept others' skilled evaluations of your own positions, and to evaluate intelligently the viewpoints and arguments of others.[3] (Numbers added)

I have pinpointed this proposal with three markers and use them to practice hard thinking within the three subsystems mentioned above (these three subsystems make up what I called a system for hard thinking in the research process). This practice is quite preliminary and I have much to learn in developing this system in the future. Hopefully, this will be useful for other researchers too. In order to present these ideas more clearly, I took help from Mullen (1995) and Donald (2002) to compile Table 10.1, which is marked by 12 numbers. Different ideas for discussion are presented by referring to these numbers.

10.2 Description and Selection

In this section, the discussion is presented with reference to markers (boxes) 1, 2, and 3 from Table 10.1. With regard to marker 1, my confidence, willingness, and skill come from my experience in two other intervention studies. The ideas that led me to start the first subproject in 2009 came from the other intervention projects (Moula 2005; Addelyan Rasi 2013). Since 1995, I have been teaching people to use a problem-solving model in meeting life's challenges. Theoretically, I was confident that what I do is in line with pragmatists who have emphasized that people
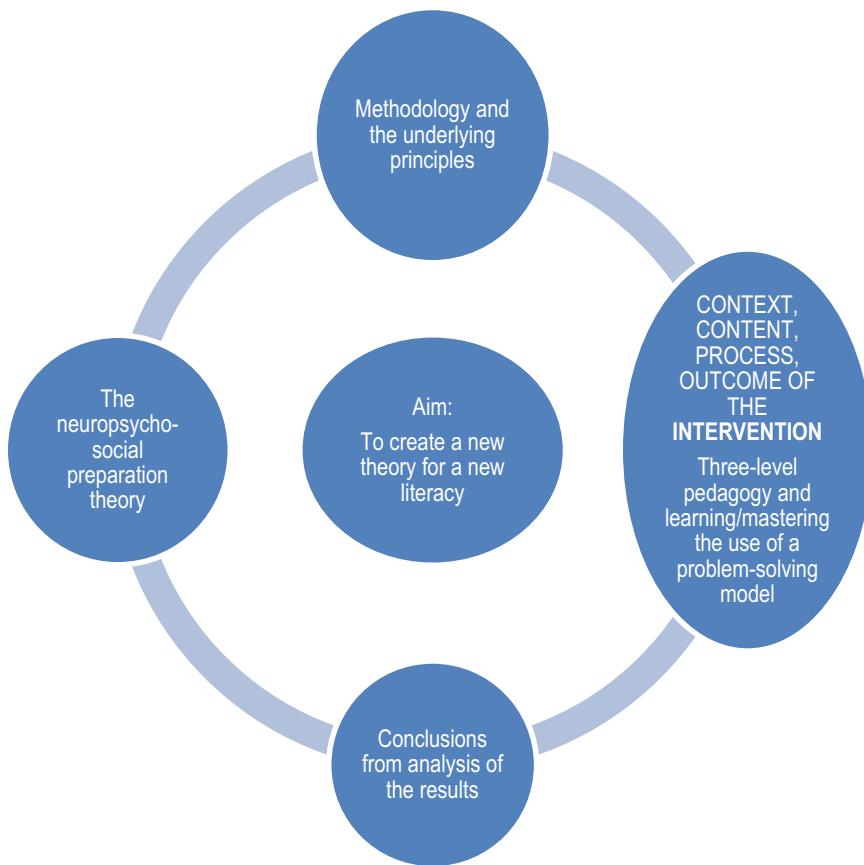
Fig. 10.1 Subsystem 1, which includes the aim, methodology, intervention results, and the new theory

start to think when they confront problems (Dewey 1910; Baron 2000). Teaching this since 1995 to both Swedes and Iranians has given me the necessary skill to continue this research intervention in schools. With regard to box 2 and the reasons for my selection of the ameliorative triad, that is, integration of the Child Convention, neuroscience, and pragmatist philosophy, a critique I got from one of the peer reviewers was that the neuroscience contribution does not add much to the intervention research and the manuscript at hand. I cannot agree. I have suggested that by starting from the neurobiological capacity of pupils—the capacity of the prefrontal cortex for organizing goal-oriented thought and action—we give them the chance to discover and trust the authority within. Actualization of this power within takes place through learning to solve various problems. This book has emphasized that by explicitly discussing the role of the prefrontal cortex in problem solving, pupils, teachers, and social workers become aware of this role.
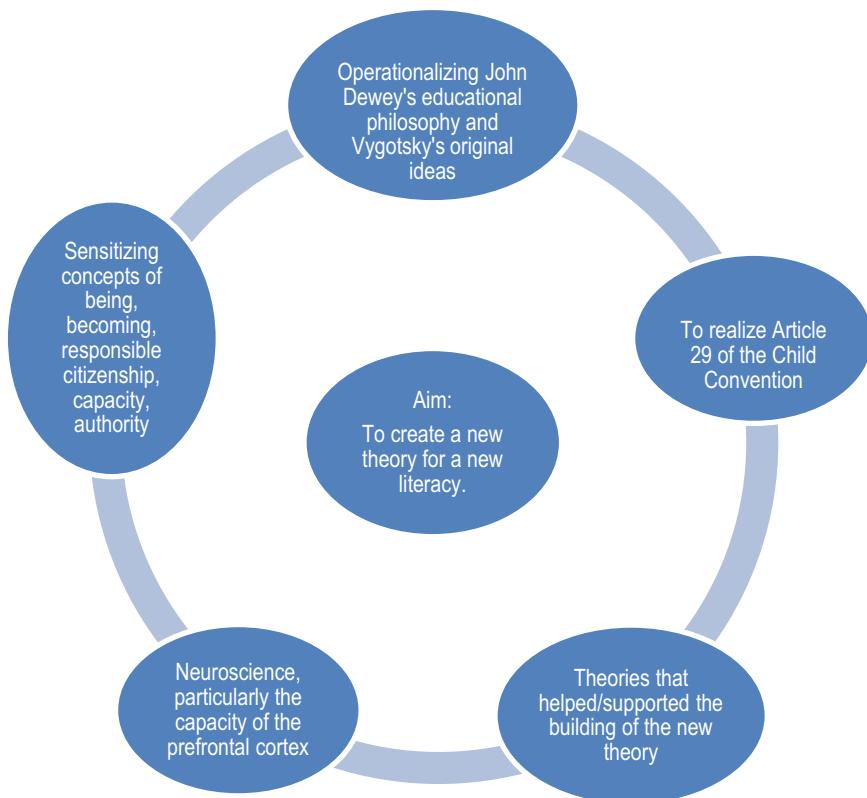
Fig. 10.2 Subsystem 2, showing what has influenced the research process

Table 10.1 Subsystem 3, which includes the 12 boxes that can be used for practicing hard thinking within a research process

	Description and selection	Representation	Inference and synthesis	Verification
Confidence, willingness, skill	1	4	7	10
Reasoning power to develop clear viewpoints and argue for them	2	5	8	11
To seek and accept others skilled viewpoints or reject them with reference to evidence and theory	3	6	9	12

This brings me to another critique I got about the vagueness of the term "authority within and without." Here I agree with this critique. I use the term authority in a different way than what is common in sociology and political science. I recognize that I need to describe this term more precisely. However, there is a

point in what I am trying to communicate. If we want to bring about change, we have to appeal to different authorities. Activating/developing the optimum capacity of the prefrontal cortex is indeed what Article 29 of the Child Convention refers to as mental development, which is the right of every pupil. Philosopher Mullen (1995, pp. 4–5) illustrated this point:

> It is a rather simple task to show that there is a direct connection between hard thinking and your own *personal freedom*, being master of your own life. A person whose mind is soft, who is soft thinker, is at the mercy of every trickster and charlatan who passes his or her way. The soft thinker falls under the control of religious hucksters, of political demagogues, of financial swindlers, medical frauds, and more… Armed with the ability to reason and the confidence that she can make intelligent judgments, the hard thinker is able to take control of her own life. (Emphasis in original)

Mullen concluded that the soft thinker is under the control of others. Some may wonder about the concepts of hard and soft thinking. However, we need to use an adjective to refer to different types of thinking. Philosophers, neuroscientists, educational theorists, and psychologists have all studied different styles of thinking. For example, good thinking (Zarathustra 2007), reflective thinking (Dewey 1910), fast and slow thinking (Kahneman 2011), preadaptive thinking (Fuster 2013a, b), hard thinking (Mullen 1995), disciplinary thinking (Donald 2002), thinking and deciding (Baron 2000; March 1994), thinking and problem solving (Baars and Gage 2010), thinking-based learning (Swartz et al. 2008), critical thinking (Kuhn 1999), lateral thinking (De Bono 1990), and the list continues. In this intervention research, with reference to pupils, I have presented the term systematic thinking, which is based on using a system, a model, and this concept is in good harmony with slow thinking, hard thinking, preadaptive thinking, thinking within a problematic situation, and reflective thinking. The model empowers one to slow down, stop and think, and reflect about one's goal and choices. This is what I mean by activating the authority within (referring to prefrontal cortex's capacity) in problematic situations. And there is a lot of evidence that the prefrontal cortex is the authority that must play an active role in such situations (Fuster 2013a, b; Baars and Gage 2010; Purves et al. 2008; see Chap. 8, Sect. 8.3.2). Following Article 29 of the Child Convention, this study continued to develop the concept of systematic thinking into ameliorative systematic thinking; thinking that intends to solve a problem and ameliorate a situation (see Chap. 8, Sect. 8.3.3).

The other authority is the Child Convention, a document signed by almost all countries in the world, and through the United Nations, pressure is put on states that have ratified it to actualize the articles in this treaty. What is interesting with this document is that although it is signed by states, it is also a vital resource for non-governmental organizations and all institutions that follow it and try to realize it. It is a document that can help ameliorate the world simultaneously from the top (governments) and the bottom (schools) and is in good harmony with pragmatist philosophy. This brings us to the other authority, which is pragmatist philosophy, and particularly the educational philosophy of John Dewey. One may wonder why choose a philosopher who died in 1952; his ideas are mainly between 100 and 60 years old. John Dewey is not physically among us anymore but his ideas are

quite alive and almost every year since his death, books and articles have been written about him and philosophers and educational scientists have developed his ideas. One of the most impressive points about pragmatist philosophers was their engagement in brain science at a time when neuroscience as an academic discipline did not exist. Indeed, the interest of pragmatists in knowledge of the brain makes the choice of pragmatism for my research, which draws on neuroscience, even more relevant. To illustrate, it is informative to draw readers' attention to a quotation from George Herbert Mead and his book, which was first available in 1934. In that, he referred to several points that are crucial for this book. These points include stop and think or delay of action, reflective choice and its contrast with immediate choice, and reference to the neurobiological site of this deliberation in the brain. The quote is long, but it reveals my claim about the relevance of pragmatism for this study and the point that pragmatism fits very well with neuroscience:

> The central nervous system makes possible the implicit initiation of a number of possible responses with reference to any given object or objects for the completion of any already initiated act, in advance of the actual completion of that act; and thus makes possible the exercise of intelligent or reflective choice in the acceptance of that one among these possible alternative responses which is to be carried into overt effect. Human intelligence, by means of the physiological mechanism of the human central nervous system, deliberately selects one among the several alternative responses which are possible in the given problematic environmental situation; and if the given response which it selects is complex—i.e., is a set or chain or group or succession of simple responses—it can organize this set or chain of simple responses in such a way as to make possible the most adequate and harmonious solution by the individual of the given environmental problem. It is the entrance of the alternative possibilities of future response into the determination of present conduct in any given environmental situation, and their operation, through the mechanism of the central nervous system, as part of the factors or conditions determining present behavior, which decisively contrast intelligent conduct or behavior with reflex, instinctive, and habitual conduct or behavior—delayed with immediate action. (Mead 1934, p. 98)

George Herbert Mead is known to sociologists as the founder of (sociological) social psychology and particularly what is known as symbolic interactionism. Mead's book *Mind, Self and Society* from 1934 is a classic in this regard. However, many sociologists neglect the first and second parts of the book, which are much about the brain, and focus on other parts, which are about self and society. This leads us to understand the importance of the role of neurophysiology for pragmatists. Mead was quite clear on this role when he stated that "While minds and selves are essentially social products, products or phenomena of the social side of human experience, the physiological mechanism underlying experience is far from irrelevant—indeed is indispensable—to their genesis" and existence (Mead 1934, pp. 1–2). I have been a member of the Society for the Study of Symbolic Interaction and have discussed the role of the brain in our behavior with interactionists and they still resist seeing what Mead saw almost a century ago! By giving the example of how an astronomer uses a telescope, Mead said

> If we want to trace the response of the astronomer, we have to go back into his central nervous system, back to a whole series of neurons; and we find something there that answers to the exact way in which the astronomer approaches the instrument under certain conditions… If a person did not have that particular nervous system, the instrument would be of no value. It would not be a telescope. (Mead 1934, p. 5)

It is exactly this point that neuroscientists have illustrated and I try to raise, that is, the relevance of the brain, particularly the prefrontal cortex, for thinking, decision making, and problem solving. It is informative to add that both Mead and Dewey were influenced by the work of William James on the brain (see Campbell 1995). William James' *The Principles of Psychology* (1890/1981) is so popular among today's neuroscientists that many of them start by referring to William James and his book, which is known as a "masterwork" (see Edelman and Tononi 2000, p. 18).

In conclusion, it is possible to assert that pragmatism is validated by recent discoveries of neuroscience (see the collection of essays edited by Solymosi and Shook 2014).

The classroom context is so crucial that I refer to it as the other authority. John Dewey's ideas are operationalized to create a proper context in the classroom. This context, as I explained and visualized in Fig. 4.1, plays a crucial role between the world outside and pupils' minds. This is illustrated perfectly by the statement of Gerth and Mills (1958) that the realities of the world and the capacities of our own bodies are learned together. However, this statement, just like Dewey's ideas, should be operationalized by creating practices (design experiments) with some details. The context constructed in this first intervention subproject included the three-level (or three-moment) pedagogy and a problem-solving model as the mental tool that empowered pupils to solve social problems. The combination of this pedagogy and learning/mastering the use of a problem-solving model is a powerful tool for preparing pupils to become thoughtful and responsible citizens. Here, an important question arises; how do we know that pupils will remember and use this model in the future? I start reflecting on this question by raising some other questions. How do pupils use what they have learned from physics and chemistry, subjects that they spend many hours to learn? Do they remember everything from these subjects? And how concretely do these subjects help pupils in their adult lives? The problem-solving model, as pupils wrote in their evaluations, changed the way they think. At the heart of problem solving is decision making, and the model helped them to make decisions in a more thoughtful way. The distinguished Swedish philosopher, Hansson (1994), in his book about decision theory, wrote that usually human activities involve decision making; therefore, to theorize about decisions is almost the same as to theorize about human activities. March (1994, pp. 271–272) went a step further by placing decision making at the heart of human beings' lives: "The elegance and beauty of human life is augmented within a vision of decision making, and human spirit is elevated. The idea of decision making gives meaning to purpose, to self, to complexities of social life."

Particularly, it is important to mention that we used the model to (fictively) solve many different kinds of problems. In other words, the pupils become prepared for problem-solving activity in real-life situations. Maybe a few pupils are prepared to become physicists or chemists. But all pupils, without exception, need to be prepared to meet life's problems. So here is the first argument considering boxes 1, 2, and 3 (Table 10.1).

Argument 1

To get inspiration for formulation of the research problem and aim in the introduction, I presented some children and youth and an international organization of youth, Free the Children. All indications show that youth are ready to be part of the solution of problems. But, how to plan for this readiness? The choice of the Child Convention, particularly Article 29, gives direction for schools or what I have argued for under the title of what should be done; the choice of neuroscience, particularly the organizing capacity of the prefrontal cortex, or what I have referred to under the title of what could be done; and the choice of pragmatist philosophy and particularly the educational philosophy of John Dewey or what I have referred to as how to do it in the context of the classroom. These three choices fit well together and their integration, including science, philosophy and an international convention, create a kind of effective authority for bring about change. This combination is a good sign of pluralism, because using ideas from three very different sources for understanding the reality of the world decreases the bias of judgment from a single source.

I am aware that such combination is a big challenge, some may even think of it as an unrealizable dream! Dreams (or wishes) are the power behind our activities. As Chambers (2013) in his closing remarks at a conference on social entrepreneurship said "If you do not imagine it, it would not happen!" Evaluating one's challenge depends very much on the strategy (aim, methodology, and methods) one has chosen. The strength of this subproject, or rather subprojects, is that I have carefully chosen a particular manageable part of the main three sources: one article from the Child Convention which contains a total of 54 articles, the prefrontal cortex from the whole brain, and John Dewey's educational philosophy from this very wide philosophical perspective (pragmatism). More important, being aware of the challenge, I have planned a series of interventions in schools with a general goal for all interventions and a particular goal for each one.

10.3   Representation

Now, I briefly consider boxes 4–6 (Table 10.1). Representation is about presenting your text through a conceptual framework of your own discipline (Donald 2002). Here comes one of the big challenges of these subprojects: which discipline and what conceptual framework? Which of the following disciplines with its conceptual framework has played the dominant role in my intervention research? Social work,

or sociology, or psychology, or educational science? What about philosophy and neuroscience? In order to answer these questions, we need to briefly look at several issues. In the first subproject (2009–2012), I was in a school class and cooperated with a teacher during his social science hours. During the second subproject (September 2013–May 2014) I cooperated with a group of leisure-time conductors.

In north European countries there is an interesting discipline called social pedagogy. Social pedagogy may be seen as a form of knowledge where good judgment is allowed to prevail. It is knowledge based on the idea of beginning with the individual, an action-oriented form of knowledge where the situation determines the response. We use feeling and imagination (creativity) in our search for the right decision and action (Eriksson and Markström 2003, p. 22). Social pedagogy is a good model for what I called the tripartite construct, which includes the individual (pupil) and what this individual should learn through interaction with others in preparation for becoming an active citizen. Pupils become empowered to make proper choices for solving problems of their own and those of others.

But even considering social pedagogy, there are different ideas on how it should be brought to schools and who should teach it. Danish social pedagogue, Madsen (2006) refers to different ways that social pedagogy can be taught; it can become part of several disciplines and all who in one way or another work with children and youth teach social problem solving. Or it can become a specific discipline within schools.

The aim of this intervention research has been to take some steps to create social problem-solving literacy. Then, who should or could teach social problem solving? Probably teachers who teach social science or school social workers are suitable to teach social problem-solving literacy and they are already placed in schools. Even teachers who teach language can play this role. However, at this stage of the research, it is not my purpose to suggest who should or could teach this new literacy. Rather, the aim was to suggest that pupils have the capacity to learn social problem solving and become prepared for performing social responsibility. The intervention research project, as we saw from the beginning, was multidisciplinary. Indeed, thinking, decision making, and problem solving, which are at the heart of the intervention and consequently the focus of this new literacy, are widely spread in disciplines such as social work, psychology, philosophy, and neuroscience. This brings us to the second argument related to boxes 4–6.

Argument 2
I think that my choices of the five sensitizing concepts were a proper choice. Being, becoming, responsible citizenship, and the authorities necessary to develop relevant capacities have played a crucial role in this research and in building the intervention-based theory. These concepts do not belong to a specific discipline, and we can develop them with reference to philosophy, social science, and neuroscience. When it comes to the question of teaching them in schools, it can be taught in many school classes, and social problem solving can be taught by school social workers, social science teachers, or teachers who teach language.

The next section is devoted to theory building, which is based on the results of the intervention.

10.4   Inference and Synthesis

This section is devoted to boxes 7–9 from Table 10.1. One critique that I got from one of the peer reviewers was that Chap. 6 included too much evidence and too many conclusions and I should try to present the main points only. I agree. But to listen to Mullen, hard thinking partly means "to seek and accept others' skilled evaluations of your own positions, and to evaluate intelligently the viewpoints and arguments of others" (Mullen 1995, p. 4). I had three options: (1) leave Chap. 6 as it is; (2) radically shorten the chapter, or (3) take a middle route. I did not choose option one because I realized that the critique was relevant and I had to do something about it. However, I could not choose option two either, because cutting a large part of the evidence and (consequently) conclusions would badly affect my claims. This is a scientific book and I had a doctoral dissertation as a model for inspiration. I needed to show the results in some detail. There were several tests, ten interviews, and even some evidence from other intervention projects (Chap. 9) and I had to present them. Therefore, I chose option three and rewrote and organized Chap. 6 (results), so that, as much as possible, it is easier to follow. I hope the readers consider the fact that there is a great difference between a scientific paper, which is usually between 5000 and 8000 words long, and the current book which has more than 60,000 words. Simultaneously, the bigger a research's claim, the more evidence should be provided. In other words, Chap. 6 may seem overloaded but I think it is necessary for the claims I have made. After all, the theory presented in this book is based on the intervention and its results and these should be revealed to readers.

In order to argue for my intervention, its strengths and weaknesses as well as its results, which led to building the neuropsychosocial preparation theory, I have to say that since 1997 I have been engaged in three intervention projects. This gives me the necessary confidence and skill to continue with this series of school interventions. My doctoral thesis (Moula 2005), my doctoral student's thesis (Addelyan Rasi 2013), my editorship of a course book (Moula 2009), and published articles and book chapters all gave me the skill to use theories in intervention research. Each of these publications brought with it praise and critique, which I learned from them to improve the next publications.

I would like to raise a few issues about the intervention. I have to be selective; four years for the intervention (three years for the first subproject and one year for the second) produced many documents, I cannot refer to them all. Let me start by referring to the strengths. Leaving the university and the students to be with the pupils has been a real joy for me. More importantly, what I have learned from these interventions, I could not have learned from a theoretical study. As Anders Josefsson (the school teacher) in Chap. 5 mentioned, the second year did not give

many results because of the few (few compared with the first and third years) occasions that I attended the school. Pupils formed into four groups but only two groups came up with suggestions. What we learned from this partial success is that *it is crucial to be at the school and work systematically with the pupils*. There have been moments of joy that are unforgettable for me. One such moment was the realization that all pupils, one by one, learned the model and gradually mastered its use. They learned to find more than one problem and more than three alternatives for solving the problem. Through this project, they learned something that *is crucial for their lives* but which they usually do not get this from school. Reason and Bradbury (2006, p. 2) expressed this issue when they wrote that

> A primary purpose of action research is to produce practical knowledge that is useful to people in the everyday conduct of their lives… So action research is about working toward practical outcomes, and also about creating new forms of understanding, since action without reflection and understanding is blind, just as theory without action is meaningless.

The particular aim of the first subproject was to develop an intervention-based theory. At the seminar, one of the opponents was critical of how I built the theory. Let us devote some lines to this issue. Four sources influenced theory building in this study. The first is Blumer's (1970) emphasis on the role of sensitizing concepts in theory building, the second is Payne's (1997) idea of practice theory, the third is Friedman's (2006) ideas of "action science," and the fourth is how to build theory after intervention in a classroom context (Cobb et al. 2003). Blumer (1970) presented one of the most general definitions of theory as the relationship between concepts.

> Theory is of value in empirical science only to the extent to which it connects fruitfully with the empirical world. Concepts are the means, and the only means of establishing such connections, for it is the concept that points to the empirical instances about which a theoretical proposal is made. (Blumer 1970, p. 87)

Payne (1997) is quite clear that social work theories are practice theories that are constructed "to give organised guidance for practice," and added that these theories are "based on sets of ideas which seek to explain how human beings respond in social relations. The guidance is given to workers on how they should act when doing social work" (Payne 1997, p. 2). Friedman (2006) emphasizes that action science is inquiry into social practice; it is interested in producing knowledge in the service of such practice. The action scientist is an interventionist who seeks both to promote learning in the subjects' system and to contribute to general knowledge. Friedman (2006, p. 132) is critical of the lack of interest of many social scientists to do action research and states that "Action science attempts to address the widening gap between social science theory/research and social science-based professional practice." Accordingly, the basic blocks of action science are theories of action. Friedman raises an important point when he added that the "gap between mainstream social science and social practice continues to grow, leading both practitioners and researchers to seek alternatives that enable them to manage the dilemma of rigor versus relevance" (Friedman 2006, p. 142). He referred to two main challenges in action science: lack of conceptual clarity and a tendency to view

action science primarily as a method of intervention rather than research. About the first challenge mentioned by Friedman, I have to say that by building on the tradition of sensitizing concepts (Blumer 1970; Bowen 2006), the five chosen concepts were brought into the intervention and were continuously compared and interpreted with the help of extant theory (Chaps. 3, 7 and 8). Considering the second challenge mentioned by Friedman that whether what one does is intervention or research, I learned from a growing tradition known in educational research as design experiment (Brown 1992; Cobb et al. 2003; Collins 1992). After mentioning the first (Blumer), the second (Payne), and the third (Friedman) sources, we come to the fourth source mentioned above which I have drawn on in building a new theory.

The fourth source that I learned from to understand the nature of the theory that I am developing is about design experiment in educational research. Within the last 15 years, a growing group of educational researchers have invented a methodology known as design experiment (I referred to references earlier). Cobb et al. (2003) emphasized that the purpose of design experiment is to develop a class of theories about both the process of learning and the means that are designed to support that learning. They also added that "the intent is not merely to investigate the process of supporting new forms of learning in those specific settings. Instead, the research team frames selected aspects of the envisioned learning and of the means of supporting it as paradigm cases of a broader class of phenomena" (Cobb et al. 2003, p. 10). This was a model for me in building the new theory; I started from the intervention in the classroom and, with the help of supporting theories, raised the results to a higher level of abstraction.

This brings me to summarize my intervention and the results by presenting the third argument concerning boxes 7–9 from Table 10.1. To be brief, I refer to one main conclusion from each year of the intervention.

Argument 3

- During the first year, pupils learned that in solving a problem, they do not need to rush; they can stop and think, let us call this "A". Then, through learning a model and continuously using it in solving fictive problems, they learned systematic thinking; let us call this "B". This intervention project found out that what happened in reality was as follows: first B and then A! You cannot tell pupils to stop and think. One should start with B, that is, teach pupils systematic thinking through using a system/model. Then, during this process, pupils learn A, that is, they learn to stop and think.
- During the second year, they used what they learned from the first year, that is systematic thinking for solving a problem, and applied this learning to come up with ideas for solutions to big problems such as supporting children in other countries and problems of our natural environment.
- During the third year, they used the learning from the first and the second years to do an assignment in geography.

In addition to these achievements, which are about the general aim of this first subproject, this intervention also helped to build a new theory. These contributions are going to be tested in other subprojects.

10.5   Verification and Evaluation in Qualitative Intervention Research

This section is devoted to boxes 10–12 from Table 10.1 and focuses on the issue of validity in qualitative research. Patton (1990) has clearly stated that there are no straightforward tests to make sure that qualitative research is reliable and valid. Pyett (2003, p. 1171), while acknowledging this point, also emphasized that this does not means that there are no "guidelines" for doing and evaluating qualitative research. I wrote an entire chapter on methodology and made it clear that many confuse methodology with method and use them as synonyms. Methodology creates guidelines for the whole process of research and is not about details or techniques of data collection and data analysis (Blumer 1970). Now let us consider the question of validity. Many qualitative research textbooks or articles say much about interviewing or observations and little about intervention or action research. Therefore, I selected Reason and Bradbury (2006) and their *Handbook of Action Research* to reflect on the issue of validity in my intervention research. In a review of more than 30 contributions written both theoretically and empirically about action research, the editors of the book suggested a framework that can be used for evaluation of action (or intervention) research. Bradbury and Reason (2006, p. 343) indicated that they "hope to build a bridge between academic concerns about validity and more reflexively practical questions about the work of action research." They added that they see their propositions on the issue of quality as initiating and sustaining an engaging conversation among action researchers and between action researchers and non-action researchers. Below I use their framework to evaluate the quality (or validity) of the first subproject through four subsections, including four themes.

10.5.1   Quality as Relational Praxis

The main issue here is about the participants and the quality of the relationships among those who were engaged in the project. Three kinds of relationships are considered: the relationship between the researcher and the teacher, the relationship between these two and the pupils, and the relationship between pupils. No doubt, without cooperation between me and the teacher, the project could not go on for three years. The main principle that united us was that the success of the project was more important for me than for him. But it was his class and if the pupils did not

learn something important, then the hours that his class devoted to this project were wasted. However, as the results from the third year showed, the pupils got the best results among all the 9th grade classes (see Chap. 5).

One important question in intervention research is whether "people are helped by their experience of participation in inquiry?" (Bradbury and Reason 2006, p. 347). As I have emphasized earlier, one of the main purposes was to effectively activate pupils' prefrontal cortex and empower them through engagement in the intervention. As the teacher, Anders Josefsson, has written at the end of Chap. 5, he has gained much from participation in this intervention by learning a new pedagogy that he can use in other classes. Even as pupils have mentioned in their evaluations, this project has improved their relationship with other pupils. Considerations of this section lead us to the next argument.

Argument 4
The quality of the relationship between the class teacher and the researcher is a prerequisite for the success of such a project. Another condition that is important is a clear method (pedagogy) that can organize the relationship between pupils and between pupils and the adults in the classroom. As mentioned, the three-level pedagogy and the problem-solving model effectively helped to organize all relationships.

10.5.2   Quality as a Reflexive-Practical Outcome

Research should help with solving people's problem, not only seek answers to questions of curiosity "posed by scientific criteria" (Bradbury and Reason 2006, p. 347). This is in line with pragmatist philosophy, which emphasizes that knowledge comes from action and should improve action. There is no essential conflict between scientific curiosity and participants' (research's subjects) interests. As Hildebrand (2008, p. 61) maintained, "knowing and living must be connected." This expert on Dewey added that if pragmatism is to be an honest philosophy, it must become not a contemporary survey of existence but an outlook upon future possibilities with reference to attaining the better and averting the worse. Child Convention's Article 29 helped to base the research's aim on a good foundation and reminds us what this intervention research is about. This brings us to the 5th argument:

Argument 5
Raising the importance of the Child Convention and basing the intervention research on it helped this study to integrate scientific inquiry with pupils' interests. The results of this study contribute to our knowledge of how pupils learn social problem solving and this learning can be useful to them in their lives.

10.5.3   Quality as Plurality of Knowing

This includes quality through conceptual-theoretical integrity and quality through methodological appropriateness (Bradbury and Reason 2006). Concerning the methodological appropriateness, I devoted a whole chapter to methodology, made principles, and tried to follow them during the research process.

Concerning the conceptual-theoretical quality, this research subproject started with a set of sensitizing concepts, used them in the intervention, and built a theory out of them with the help of other theoretical propositions. According to Bradbury and Reason (2006, p. 347), at least two points are valuable to raise here. The first is that theory should bring order to complex phenomena with the goal of being useful "to the community of inquiry." Although neuropsychosocial preparation theory has a multifaceted base—the ameliorative triad and the tripartite construct—it provides a three-level (and three-moment) pedagogy with a problem-solving model that is easy to understand and use.

Another point about theoretical concerns that Bradbury and Reason (2006, p. 347) indicated was about asking "if our new theory allows us to re-see" the world. In the introduction, I stated the research's problems, partly based on my observations, and tried to show that children and youth are ready to be part of the solution of the world's problems. Then I tried to take the first steps toward creating a new literacy to be able to take care of this readiness of youth. I hope that this research contributes to seeing this possibility. This brings us to the next argument.

Argument 6
We should take the readiness of children and youth to help to ameliorate the world's situation *seriously*. Schools are a very proper space for realization of children and youth's capacities to become social problem solvers.

10.5.4   Quality as Engaging in Significant Work

Bradbury and Reason (2006, p. 348), in studying all contributions in their book, wrote that

> As we review the inquiry project reported in this volume, we are struck that while all contributors are concerned with addressing questions they believe to be significant, few pay *explicit* attention to inquiring into what is worthy of attention, how we chose where to put our efforts. (Emphasis in original)

As action researchers, we should ask "whether or not we ought to be doing what we are doing at all." One possible answer is that "it is more worthwhile to articulate the positive, life-enhancing qualities in a situation and to amplify these," that is, pay attention to the issue of empowering people (Bradbury and Reason 2006, p. 348). Indeed, these two issues—continuous reflection on one's ongoing research and if this research is empowering people—are the strengths of this intervention research.

The issue of empowering people is at the heart of this intervention. And that is why, despite critiques, I have been stubborn in keeping the term the "authority within" and emphasize how important it is that pupils, and of course teachers and school social workers, discover the power of the prefrontal cortex and consciously invest in this capacity in pupils' brains. This is truly *sociocognitive empowerment* and that is exactly what the Child Convention, particularly Article 29, demands schools to do. Then, no wonder if a researcher tries to realize one of children's rights and concludes that his or her intervention research is about empowering pupils!

The other issue is about continuous reflection on one's ongoing intervention. How can I go around and teach people to think and then not think and reflect on what I am doing and for what purpose?! The answer to this question has at least two dimensions. The first is whether our research is for the benefit of people and I have replied to that in the previous paragraph, so I will devote the next lines to the scientific issues of this study. Indeed, this brings us to an overall review of this study. During this research, I had in mind this statement of Dewey (1910, pp. 2–3) that "The successive portions of the reflective thought grow out of one another and support one another; they do not come and go in a medley." (See the complete quotation at the Epilogue) I have not been perfect in following this, but I have been trying and as my supervisor (when I was a doctoral student) told me years ago; we have to try out ideas and must expect that sometimes we will succeed and sometimes we will fail. Table 10.2 summarizes the reflective thought of the first subproject started in September 2009 and continued until June 2012, and it brings up *the reply to the research question posed in the Introduction* (Chap. 1).

Considering what should be done, the great possibility is that schools often respect the Child Convention, and if a researcher is willing to work on the basis of this treaty, schools may provide the necessary space. However, the challenge is how to convince the academic world of scholars to show interest in the Child Convention and perform intervention on the basis of this treaty. Under this intervention, I talked to a few doctoral students to see if they showed interest but without

Table 10.2 The challenges and possibilities in the current study

	Challenges	Possibilities
What should be done? Child convention	How to encourage more researchers to do intervention research with directives from the Child Convention?	Schools respect the Child Convention. This possibility can be used for intervention research in schools
What could be done? Neuroscience	How to convince single-discipline researchers, who probably are in the majority, about the advantages of multidisciplinary research?	Insights from neuroscience open up a new world about the capacities of our brain. Social researchers can use these new insights
How to do it? Pragmatist educational philosophy	Who should be trained to teach social problem solving? Teachers? Social workers? Or others?	The three-level (or three-moment) pedagogy and the continuous use of the problem-solving model give us a great possibility for intervention in schools

much success. There are some other difficulties. Intervention research is different from other forms of research and is not easy to do; it takes time and energy, you collect lots of data that will not be easy to analyze, and even sometimes you may get the critique that what you have done is intervention and not research! To find solutions for these difficulties is the challenge for the current study.

Considering what could be done, there is growing interest among psychologists and educational psychologists in integrating knowledge of neuroscience with how pupils learn in schools. However, the challenge is that this interest in neuroscience is still weak. I think this is only a question of time. There will come a time when social scientists' doubts will disappear and they, just like psychologists, will show more interest.

Considering the question how to do it, I have been doing this since 2009 in different schools and classes and hopefully this study can be a good model. But another challenge arises here: who should teach social problem solving in schools? Social science teachers or school social workers? And how to educate them for just this task? Hopefully, the other subprojects will come up with some valuable answers.

To conclude the discussion of the possibilities and challenges, I refer to action researchers, Senge and Scharmer. Their statement fits well with the current intervention research and its ambition.

> In a new field, the cycle of theory creation and its extension into practical tools and ultimately into a broad base of practical know-how may take many years. If this new knowledge represents a deep shift in prevailing ways of thinking and problem-solving, it may take generations. (Senge and Scharmer 2006, p. 198)

The above quotation and the warning that creating a deep shift in people's ways of thinking and problem solving may take generations, brings me to the last argument.

Argument 7
I am aware of the great challenges in this study but try *to learn* from Martin Luther King's well-known phrase (speech): "I have a dream!" There is nothing wrong with researchers having dreams; on the contrary, it is a strength! While dreams can be, and should be, the great energy behind everyone's ameliorative activity, researchers' dreams (Dewey call it desire, some call it vision) should be coupled with scientific scrutiny. Therefore, I repeat Kandel's (2006, p. 115) remark: "Science gives one a structured opportunity to try out ideas—and, if one is not afraid of falling on one's face, to try out ideas that are raw, important, and bold."

References

Addelyan Rasi, H. (2013). *Empowering women in the Middle East by psychosocial interventions*. Linköping University Medical Dissertation No. 1320.

Baars, B., & Gage, N. (2010). *Cognition, brain, and consciousness: Introduction to cognitive neuroscience*. Amsterdam: Elsevier.

Baron, J. (2000). *Thinking and deciding* (3rd ed.). Cambridge: Cambridge University Press.

Blumer, H. (1970). What is wrong with social theory. In N. Denzin (Ed.), *Sociological methods* (pp. 84–95). London: Butterworth.

Bowen, G. (2006). Grounded theory and sensitizing concepts. *International Journals of Qualitative Methods, 5*(3), 12–23.

Bradbury, H., & Reason, P. (2006). Conclusions: Broadening the bandwidth of validity. In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. 343–351). London: Sage Publications.

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions. *Journal of the Learning Sciences, 2,* 141–178.

Campbell, J. (1995). *Understanding John Dewey*. Chicago: Open Court.

Chambers, S. (2013). Speech at a conference: https://www.youtube.com/watch?v=VQP0i9a8IkQ

Cobb, J., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiment in educational research. *Educational Researcher, 32*(1), 9–13.

Collins, A. (1992). Toward a design science of education. In E. Scanlon & T. O'Shea (Eds.), *New directions in educational technology*. Berlin: Springer.

De Bono, E. (1990). *Lateral thinking*. London: Penguin Books.

Dewey, J. (1910/1997). *How we think*. New York: Dover Publications.

Donald, J. (2002). *Learning to think: Disciplinary perspectives*. San Francisco: Jossey-Bass.

Edelman, M., & Tononi, G. (2000). *A universe of consciousness: How matters become imagination*. New York: Basic Books.

Eriksson, A., & Markström, A. (2003). Interpreting the concept of social pedagogy. In A. Gustavsson, H. Hermansson, & J. Hämäläinen (Eds.), *Perspectives and theory in social pedagogy* (pp. 9–23). Goteborg: Daidalos.

Friedman, V. (2006). Action science: Creating communities of inquiry in communities of practice. In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. 131–143). London: Sage Publications.

Fuster, J. (2013a). Cognitive functions of the prefrontal cortex. In D. Stuss & R. Knight (Eds.), *Principles of frontal lobes functions* (2nd ed., pp. 11–22). New York: Oxford University Press.

Fuster, J. (2013b). *The neuroscience of freedom and creativity: Our predictive brain*. Cambridge: Cambridge University Press.

Gerth, H., & Mills, W. C. (1958). *From Max Weber: Essays in sociology*. New York: Oxford University Press.

Hansson, S. O. (1994). *Decision theory*. Stockholm: Royal Institute of Technology.

Hildebrand, D. (2008). *Beginners guides on Dewey*. Oxford: Oneworld.

James, W. (1890/1981). *The principles of psychology*. Cambridge, MA: Harvard University Press.

Kahneman, D. (2011). *Thinking fast and slow*. New York: Penguin Books.

Kandel, E. R. (2006). *In search of memory: The emergence of a new science of mind*. New York: W.W. Norton.

Kuhn, D. (1999). A developmental model of critical thinking. *Educational Researcher, 28*(2), 16–25.

Madsen, B. (2006). *Socialpedagogik: Integration och inklusion i det moderna samhället*. Lund: Studentlitteratur.

March, J. (1994). *A premier on decision making*. New York: Free Press.

Mead, G. H. (1934). *Mind, self, & society, from the standpoint of a social behaviorist*. Chicago: University of Chicago Press.

Moula, A. (2005). *Population based empowerment practice in immigrant communities*. Linköpings universitet, Medical dissertation 887.

Moula, A. (2009). *Empowermentorienterat socialt arbete*. Lund: Studentlitteratur.

Mullen, J. (1995). *Hard thinking: The reorientation of logic to everyday life*. Boston: Rowman & Littlefield.

Patton, M. (1990). *Qualitative evaluation and research methods* (2nd ed.). Thousand Oaks: Sage.

Payne, M. (1997). *Modern social work theory* (2nd ed.). London: Macmillan Press.

Purves, D., Cabeza, R., Huettel, S. A., LaBar, K. S., Platt, M. L., & Woldorff, M. G. (2008). *Principles of cognitive neuroscience*. Sunderland, MA: Sinauer Associates.

Pyett, P. (2003). Validation of qualitative research in the "real world". *Qualitative Health Research, 13*(8), 1170–1179.

Reason, P., & Bradbury, H. (2006). Preface. In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. xxi–xxxii). London: Sage Publications.

Senge, P., & Scharmer, C. (2006). In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. 195–206). London: Sage Publications.

Solymosi, T., & Shook, J. (2014). *Neuroscience, neurophilosophy, and pragmatism: Brains at work with the world*. London: Palgrave Macmillan.

Swartz, J., et al. (2008). *Thinking-based learning*. Norwood: Christopher-Gordon Publisher.

Zarathustra. (2007). *The Gathas: The sublime book of Zarathustra*. Translated with an introduction by Khosro Khazai. Brussels: European Centre for Zoroastrian Studies.

Chapter 11
Applying the New Theory in Other Subprojects

Abstract The aim of the first subproject was to create a new theory for a new literacy. Judgment of the seriousness of the first subproject, at least partly, depends on whether it has continued in other projects. Therefore, it is important that the readers get a picture of the second subproject. *Aims of subproject II:* Through a series of design experiments (intervention research subprojects in schools), develop a program for social problem-solving literacy. This includes

- Understanding how pupils can learn that an individual should not rush to choose the first option that comes to mind to solve a problem, but they can stop and think to find the best available option.
- Finding out if pupils can master the use of a model to solve social problems (points 1 and 2 were common to both the first and second subprojects).
- Testing the theory that evolved from the first subproject in the second subproject.

The theory that was built during the first project worked well in four different classes and in other schools. The conclusions from the first project were approved and some new ideas—such as the importance of time and place of teaching—were added to our knowledge. The process of further testing and refining the theory in other subprojects will continue.

Keywords The second subproject · De Bono's evaluation system · Confirming the constructed theory

The aim of the first subproject was to create a new theory for a new literacy. As mentioned earlier, I am completely aware that this is an ambitious aim and any new theory should be tested on other occasions. In other words, judgment of the seriousness of the first subproject, at least partly, hangs on whether it has continued in other projects. Therefore, it is important that the readers get a picture of the second subproject. Below, I briefly present the second subproject, as it was planned, followed by the analysis of the collected data.

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11.1   Subproject II: How Can Youths Make Deliberate Decisions and Solve Fictive Problems

The aim of the second subproject was much like the first one, with the difference that, now we had a theory to guide us in our intervention. In other words, in the second intervention both an "old" idea (aim of the first subproject) and a new theory that evolved from the first intervention were tested.

11.1.1   Aims of Subproject II

Through a series of design experiments (intervention research subprojects in schools), develop a program for social problem-solving literacy. This includes:

- Understanding how pupils can learn that an individual should not rush to choose the first option that comes to mind to solve a problem, but, they can stop and think to find the best available option.
- Finding out if pupils can master the use of a model to solve social problems (points 1 and 2 were common to both subprojects).
- Testing the theory that evolved from the first intervention.

11.1.2   Pupils and Personnel

- Two classes of pupils, 7th grade, from a rural area outside Karlstad city.
- One class, 8th grade, from a school in Karlstad city.
- A group of female pupils from a school in an immigrant populated area.
- Total of 80 pupils.
- The recreation-time personnel who meet these pupils, daily, either during school time or after school.

11.1.3   Method

Educate, engage and, supervise recreational personnel in this project who spend several hours a week with these pupils. I as the researcher was with the pupils and the personnel for one hour per week and had the responsibility for the whole project.

The project took place from September 2013 to June 2014 for one hour every week in each class. Karlstad's University and Karlstad's Municipality were partners in the project and provided funding.

Through learning a problem-solving model, youths learn to solve fictive problems and make deliberate decisions. Every week, we (the personnel and I as the researcher) presented a new dilemma and pupils used the model to solve it. We used the same three-moment pedagogy that was used in the first subproject (see Chap. 5).

In the first subproject, I analyzed the results, but in this second subproject, I preferred to let the personnel who were completely engaged do the evaluation. Therefore, I used De Bono's known model to analyze the assessments of the eight personnel who participated in the evaluation. This model includes six steps: facts, feelings, positivity, weakness/risks, creativity, and a holistic approach. The personnel were provided with a table with these six steps and they wrote in that table.

11.1.4   Facts

All eight personnel who participated in the evaluation referred to "the fact" that pupils "learned the model." But, learning is a matter of degree. The two classes in the rural area showed great variation. As the two personnel from that school emphasized, the degree of the motivation of pupils in these two classes was very different. But amazingly on the day of the final test, three girls from the class that showed less motivation sat and, with great concentration, wrote down their evaluation of the project for more than 60 min. We learned that we should be very careful in our judgments! Another issue that comes up under "facts" is that the personnel wrote that pupils learned not to rush to (fictively) solve the problem but they learned to stop and think. One of the personnel refers to "the fact" that using the problem-solving model was an effective instrument that organized cooperation between 10 recreation-time personnel from several recreation-time centers, 80 pupils, and Alireza Moula (the researcher).

Another "fact" that emerged from the evaluation of the personnel was that pupils learned to listen to each other and cooperate when we divided them into small groups. Most of the personnel put their finger on "the fact" that the concluding ceremony was very successful. All pupils, personnel from the recreation centers and some of the pupils' families participated in the concluding ceremony where pupils went on to the stage and through creative presentations showed what they had learned in this project.

11.1.5   Emotions

In this step of the evaluation model, the personnel expressed their feelings about the project. Those who were working with the group of immigrant girls were worried that a kind of competition between girls might develop and this would negatively

affects the "we feeling" in the group. Once I raised an idea in the group about giving a computer to one of the girls in the group to write down every day what she has learned from the model and other things around the model. But the personnel rejected the idea and emphasized that the most important thing for them was that the girls remain friendly with each other and the "we feeling" was vital for them. I understood and respected that goal and we continued our work according to our plan.

Some of the personnel expressed positive feelings about the concluding ceremony; all personnel, pupils, and their families who attended the ceremony were happy and satisfied with the project. One of the personnel expressed his positive feelings as a result of observing the processes whereby pupils gradually learned the model. Another expressed her positive feelings about the kind of cooperation that was developing between the personnel from four recreational centers, 80 pupils, and the researcher (Alireza Moula).

11.1.6 Positivity

Most of the personnel indicated two positive issues: (1) all children learned the model and (2) the concluding ceremony was successful. One of the personnel indicated that it was positive to learn a model that could be useful throughout life. Another personnel mentioned that it was quite positive to observe how pupils learned different things. One issue that I observed, again, when analyzing texts written under "positivity" was that learning is a matter of degree. One of the personnel observed that Alireza's (the researcher's) relationship with all personnel and pupils were very constructive and this has positively affected the project. The whole project, including the relationship between me (the researcher) and the ten personnel was affected by what we may call an empowering space. The model we used was, indeed, an empowering model and consequently it positively affected the whole process and all relationships.

11.1.7 Weakness or Risks

The main issue that was taken up under this point was about the time and the place where pupils participated in the project for one hour every week. Two of the classes were during school time, before lunch, and at school. There were no complaints about these two classes. But for the two other classes, the pupils left their school in the afternoon and went to the recreation centers to participate in the project, before going home. The personnel wrote that both the time and the place had negative effects on their learning. The pupils were tired and hungry; it was much better if we could get together at school and during school time.

11.1.8   Creativity

Most of the personnel wrote about the role that the problem-solving model played; through it, pupils learned not to rush to find the answer to the dilemma, but with patience go through the steps of the model. This gave the pupils the chance to think and be creative in finding proper solutions. What these personnel wrote is interesting; *creativity of this type is cognitive*, you have to use systematic thinking to find a proper solution. For example, one of the personnel indicated that the more the pupils trained, the more they mastered using the model and the more creative they became in finding various options for solving the (fictive) problems.

11.1.9   A Holistic Approach

Under this point, I summarize subproject II. It is important to state that these two subprojects had both similar and different aims. The similarity was that we used the same idea and method in both projects; to teach social problem solving to pupils, and for this we used the three-moment pedagogy. But what was the difference? The first took three years with the aim of building a theory. Therefore, only one class was chosen, so I (the researcher) could focus on quality and not quantity. The purpose of the second subproject was to see if the theory that evolved during subproject I could be used, with positive results, in four very different classes. Here, quantity becomes important. The overall evaluation of the eight personnel who participated in the evaluation is satisfactory. Here I briefly refer to several points raised by these personnel that summarize the overall results of the second subproject. Each point was raised by one of the personnel and together they give us a picture of the second subproject:

- During this year I (one of the personnel) could observe how pupils gradually learned and developed.
- The project and the model—which was at the heart of the whole project—could help the personnel to cooperate with each other.
- It is interesting to see if in future we will be better human beings with the help of this model.
- It is important to choose a time and a place that will be comfortable for the pupils, not late in the afternoon and not outside the school.
- It was important that the researcher who managed the project was really interested in what he did.
- It was important that the project had a clear connection to the Child Convention.
- The problem-solving model played a positive/empowering role in organizing pupils' process of learning and in creating a space for cooperation among all engaged in the project.

To conclude, the theory that was built during the first project worked well in four different classes in other schools. The conclusions from the first project were approved and some new ideas—such as the importance of time and place of teaching—were added to our knowledge. The process of further testing and refining the theory in other subprojects will continue.

Epilogue

> It is an absurd and antique attitude to believe that thinking is natural and therefore needs no instruction. It is absurd and antique to believe that normal education teaches sufficient thinking. There is real need to teach thinking deliberately and directly as a separate subject in education (both schools and universities.) (De Bono 2009, p. 247).

This book is an argument on the need to create what De Bono calls a separate subject in education. In the Prologue, I draw the attention of the readers to the need for a new theory that can guide us in creation of this new subject in schools. Different chapters of the book focused on the philosophical, methodological, and conceptual elements necessary for creation of this intervention-based neuropsychosocial theory. In this Epilogue, from a new angle, I recapitulate on the mental tool that is at the heart of this new theory and has been presented in great details in different chapters of this book. This mental tool, which gets good support from recent knowledge of the functions of the prefrontal cortex in human beings, is about a representative problem-solving model and its steps. Such models give the pupils the chance to develop their cognitive capacity and can prepare them for ameliorative preadaptation to the world. Learning and training one of these models in schools is at the heart of connecting (pupils') brains to school and to society through a systematic and goal-oriented process. The content in the steps of these models are so prevalent and universal that we can refer to it as the accumulated wisdom of the human race in meeting problems. In Sect. 3.4.2 several such models were presented and in Sect. 8.3.3 some details of a problem-solving model were discussed. Such a typical problem-solving model can be discussed in the context of five domains where each domain is identified by a key concept: Reality, Change, Possibilities, Action and Evaluation (acronym, RECAP).

About 4000 years ago, Zarathustra (2007), one of the first secular social thinkers paid great attention to what he called "Asha" translated as truth, reality, or righteousness. In his only text that we know of (about 6000 words) he has used the word "Asha" 162 times. Khazai (2007, p. 27) explained that Asha is the axis around which the "ethics of Zarathustra and the entire structure of his philosophical system" revolve. "I praise righteousness, and as long as I have patience and have strength, I shall be searching for it." (Zarathustra 2007, p. 102) Understanding reality has been and still forcefully is the basis for all sciences, philosophy, history,

journalism, the judicial system, and proper performance in our daily lives. Two senior sociologists warn us about neglecting reality by being drowned in an ocean of theories: "Reflection, man's greatest discovery in the history of the human mind, was immediately followed by the greatest and gravest mistake—that of doubting the reality of the real world" (Lorenz, quoted in Lyng and Franks 2002, p. 1). Lyng and Franks emphasize that we need theory but they also suggest "reclaiming three words that in many sociological circles have fallen into disrepute—often for good reason, but often not. They are *objectivity, reality and truth*." (Emphasis in original) That is why the theory constructed in this book was based on consideration of the realities of our world (see Chap. 1), and this theory should be continuously tested and refined through intervention in various societies.

The second step of such a typical problem-solving model is about an attempt to momentarily "leave the domain of reality" and in our imagination fly to "the domain of desires" to look for the change. Civil activist and author of several popular books, Zlata Filipovic, expressed herself in the following words:

> Unfortunately, I have realized that we cannot completely erase all the evil from the world, but we can change the way we deal with it, we can rise above it and stay strong and true to ourselves. And most important, we can inspire others—that is what makes us human beings, this is what can make us immortal." (Filipovic 2009, p. xvii)

Immortal? That is what Zarathustra emphasized so many years ago when he said that our bodies perish but our thoughts based on righteousness remains for many future generations. And that is why I can refer to these five old key concepts (Realty, Change, Possibilities, Action, and Evaluation or its acronym RECAP) as the "recap" of the human race's wisdom in meeting problems. Sometimes other concepts are used instead of change, concepts that are loaded with emphasis on dissatisfaction with the existing reality and a need for change toward the better. These concepts tie in with improvement and amelioration. The influential sociologist, Cooley (1918, p. 408) expressed the idea of change for the better in a poetic way:

> I hold, then, that progress, like human life in every aspect, is essentially tentative, that we work it out as we go along, and always must; that it is a process rather than attainment. The best is forever indefinable; it is growth, renewal, onwardness, hope. The higher life seems to be an upward struggle toward a good which we can never secure, but of which we have glimpses in a hundred forms of love and joy… The thing for us is to believe in the reality of this larger life, seen or unseen, to cling to all persons and activities that help to draw us into it, to trust that though our individual hold upon it relax with age and be lost, yet the great Whole, from which we are in some way inseparable, lives on in growing splendor. *I* may perish but *We* are immortal. (Emphasis in original)

The third step of such an archetypical problem-solving model is the domain where we integrate our thoughts from domains one and two. It is imaginative consideration of the possibilities for change. The concept of possibility includes concepts such as imagination and judgment between different options and understanding the importance of the choice we make. Once more we can refer to Zarathustra (2007) who emphasized that human beings are free to choose between

various options but they have to choose according to righteousness, good thought and wisdom and then accept responsibility for their choice: "Thus before you are led through the *Great Event of Choice*, hear only the best with your ears and see with the eyes of your wisdom." (Zarathustra 2007, p. 61, emphasis in original) As sociologists emphasize, the powerful influences of natural and social environments limit our freedom of choice. However, to take this influence to the extreme, that is, see environmental influences as deterministic, would make us slaves of our environments, an idea that is not acceptable. So, the more we emphasize our freedom of choice, the more we should study various options before the act of choosing. As winner of the Noble Prize, Kahneman (2011, p. 415), mentioned, humans "need help to make good decisions, and there are informed and unintrusive ways to provide that help." Such representative models and their five steps based on mankind's accumulated wisdom are indeed "unintrusive" and truly empowering. For this third domain, people are encouraged not to rush to the first available option but patiently search for several options and study them before choosing one. This is what Dewey (1922, p. 190) called deliberation:

> Deliberation is an experiment in finding out what the various lines of possible action are really like… The experiment is carried on by tentative rehearsal in thought which do not affect physical facts outside the body. Thought runs ahead and foresees outcomes, and thereby avoids having to await the instruction of actual failure and disaster. An act overtly tried out is irreversible, its consequences cannot be blotted out. An act tried out in imagination is not final or fatal. It is retrievable.

After consideration of reality (domain 1), using imagination to think of desirable change (domain 2), and the study of various options and their consequences (domain 3), now, the fourth step is the domain of action, when we choose the best option and a detailed plan for realizing that option. It is important to pay attention to the fact that success in the fourth step of the model depends on going patiently through the three first steps. Through action, we test our desires for change, sometimes we succeed and sometimes not. Pragmatism was the main philosophy that was used in this book. Reynolds explains that this philosophy sees human beings as creative, active agents, and emphasizes that action "is the means for checking the accuracy of a hypothesis and hence the focus of reality" (Reynolds 1993, p. 16). This book has emphasized that teaching such a representative problem-solving model is about empowering pupils. "Empowerment is the process of increasing the capacity of individuals or groups to make choices and to transform those choices into desired actions and outcomes" (www.worldbank.org, October, 2009)

Finally, the last step of such a model is about evaluation. Evaluation means thinking about the result of our action. But thinking and result are synonyms for reflection (Oxford Thesaurus 1992). In other words, evaluation involves reflection. According to Dewey, reflection has a distinctive content

> Reflection involves not simply a sequence of ideas, but a *consequence*—a consecutive ordering in such a way that each determine the next as its proper outcome, while each in turn leans back on its predecessors. The successive portions of the reflective thought grow

out of one another and support one another; they do not come and go in a medley. Each phase is a step from something to something—technically speaking, it is a term of thought. Each term leaves a deposit which is utilized in the next term. (1910, pp. 2–3) (Emphasis in original)

These words of Dewey are not only about the last step of the typical model, but also apply to the connection between all five steps of the model and how these steps constitute a system of thinking in which all parts are tightly connected.

Thus, the creation of a special subject in schools at the heart of which is a representative problem-solving model has great capacity to prepare pupils to meet problems—personal problems, family problems, or big social issues such as war and poverty. In the same way that pupils learn some principles and formulas to solve problems in mathematics, physics, and chemistry, they can also learn a model to meet major social problems and problems in their daily lives. Learning and continuously training in such a model in school has several positive side effects. Pupils learn to think systematically and deliberately; they learn how to decide wisely; and they learn not to rush to solve a problem but stop and think, which means they develop a very important capacity, that is, patience and self-control. Some researchers believe that this very capacity is crucial for success in life (Moffitt 2011).

Pupils study many subjects for many years. There is a real need to create a space to learn this new subject. The important point is that there should be continuity so that pupils can train in the use of such a representative model over several years in school so it becomes a habit of mind. The distinguished neuroscientist, Antonio Damasio, explains this process in rather simple terms:

Outsourcing expertise to the nonconscious space is what we do when we hone a skill so finely that we are no longer aware of the technical steps needed to be skillful. We develop skills in the clear light of consciousness, but then we let them go underground, into the roomy basement of our minds, where they do not clutter the exiguous square footage of conscious reflection space." (Damasio 2010, p. 275)

Iranians have a saying: drop and drop come together and consequently we have a sea of water. The issue is how intervention in a few schools can create enormous changes in our problematic world. Through creating a working design, a successful example, we may be able to create hope and encourage others to start similar projects.

Some people come to believe that there is, in fact, a role for decisive human action in determining the course of history. Some find hope in a general sense that human destiny is within human control. Others find hope in the way in which path-dependent, branching histories are sensitive to small interventions at particular points. (March 1994, p. 266)

Yes, "small interventions" based on discoveries of neuroscience and the support of the Child Convention have the capacity to prepare pupils for creating changes in our world that the majority of adults do not want or cannot create.

References

Cooley, C. H. (1918). *Social process*. Carbondale: Southern Illinois Press.

Damasio, A. (2010). *Self comes to mind: Constructing the conscious brain*. London: William Heinmann.

De Bono, E. (2009). *Think! Before it is too late*. London: Vermilion.

Dewey, J. (1910/1997). *How we think*. New York: Dover Publications.

Dewey, J. (1922/2002). *Human nature and conduct*. New York: Dover Publications.

Filipovic Z (2009). Foreword. In Gruwell E, *The freedom writers diary* (pp. xiii-xvii) New York: Broadway Books.

Kahneman, D. (2011). *Thinking fast and slow*. New York: Penguin Books.

Khazai, K. (2007). Introduction. In *The Gathas: The sublime book of Zarathustra* (pp. 10–49). Brussels: European Centre for Zoroastrian Studies.

Lyng, S., & Franks, D. (2002). *Sociology and the real world*. Lanham: Rowman & Littlefield.

March, J. (1994). *A premier on decision making*. New York: Free Press.

Moffitt, T. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Science, 108,* 2693–2698.

Oxford Thesaurus. (1992). American edition. New York: Oxford University Press.

Reynolds, L. (1993). *Interactionism: Exposition and critique* (3rd ed.). New York: General Hall.

Zarathustra. (2007). *The Gathas: The sublime book of Zarathustra*. Translated with an introduction by Khosro Khazai. Brussels: European Centre for Zoroastrian Studies.

Appendix 1
The Problem-solving Model Used for Learning How to Solve Fictive Problems

A problem-solving model with four steps

1	To understand the situation and identify the problem or problems
2	What do you wish? (To decide to solve the problem)
3	To imagine several possible options for solving the problem
4	To choose one of the options and plan for its realization

Appendix 2
The Posttest That Was Given to Pupils in the Fourth Month of the First Subproject

What is the problem (or problems)?

What are your wishes? What is a desirable situation?

What are the possible options?

 Option 1   Option 2   Option 3   Option 4   Option 5

What are the possible consequences of each option for Tara and her family?

After consideration of these options and their consequences, choose the best and plan for its realization.

The end of the Tara's story.

Next question: What have you learned from the problem-solving model and the project?